



Aerospace Medicine  
and Biology  
A Continuing  
Bibliography  
with Indexes

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August 1982

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Accession numbers cited in this Supplement fall within the following ranges.

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# **AEROSPACE MEDICINE AND BIOLOGY**

## **A CONTINUING BIBLIOGRAPHY WITH INDEXES**

**(Supplement 235)**

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in July 1982 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

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# INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 201 reports, articles and other documents announced during July 1982 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

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An annual index will be prepared at the end of the calendar year covering all documents listed in the 1982 Supplements.

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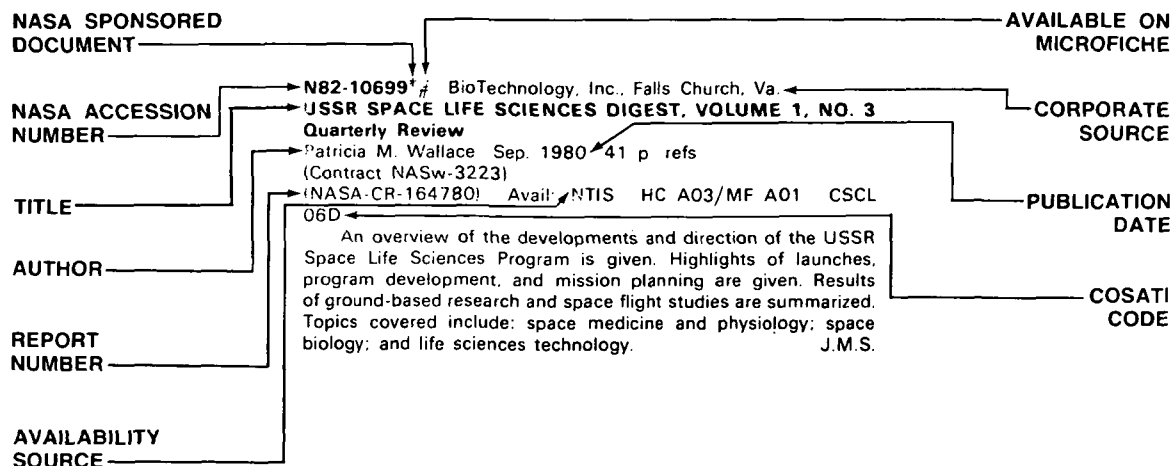
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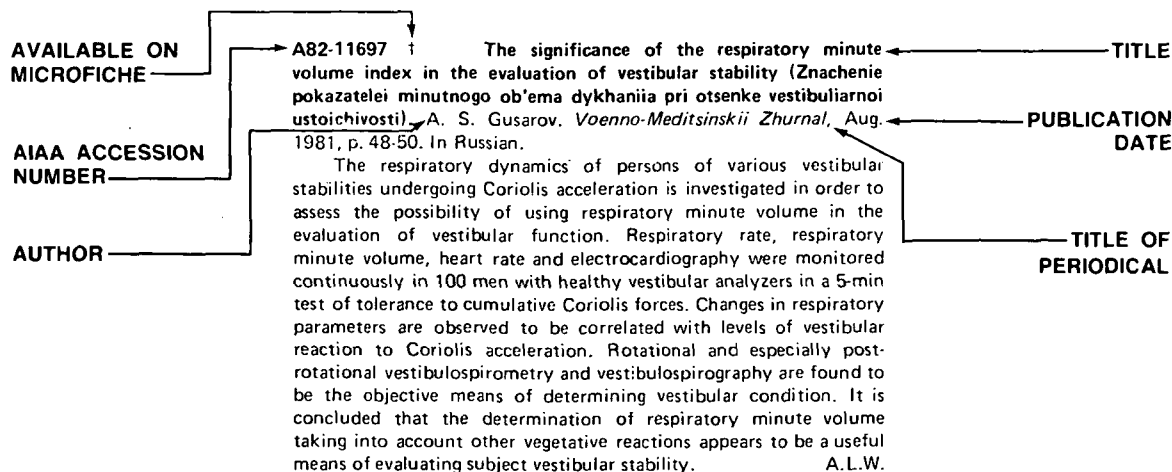
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## TYPICAL CITATION AND ABSTRACT FROM IAA



# AEROSPACE MEDICINE AND BIOLOGY

*A Continuing Bibliography (Suppl. 235)*

AUGUST 1982

## IAA ENTRIES

**A82-28596** Mass mortality and its environmental and evolutionary consequences. K. J. Hsü, Q. He, J. A. McKenzie, H. Weissert, K. Perch-Nielsen, H. Oberhänsli, K. Kelts (Zürich, Eidgenössische Technische Hochschule, Zurich, Switzerland), J. LaBrecque, L. Tauxe (Lamont-Doherty Geological Observatory, Palisades, NY), and U. Krähnbühl (Bern, Universität, Berne, Switzerland). *Science*, vol. 216, Apr. 16, 1982, p. 249-256. 46 refs. Swiss National Science Foundation Grant No. 2,650,080; NSF Grant No. OCE-81-19695.

The latest Mesozoic and earliest Tertiary sediments at Deep Sea Drilling Project site 524 provide an amplified record of environmental and biostratigraphic changes at the end of the Cretaceous. Closely spaced samples, representing time intervals as short as 100 or 1000 years, were analyzed for their bulk carbonate and trace-metal compositions, and for oxygen and carbon isotopic compositions. The data indicate that at the end of the Cretaceous, when a high proportion of the ocean's planktic organisms were eliminated, an associated reduction in productivity led to a partial transfer of dissolved carbon dioxide from the oceans to the atmosphere. This resulted in a large increase of the atmospheric carbon dioxide during the next 50,000 years, which is believed to have caused a temperature rise revealed by the oxygen-isotope data. The data indicate that many of the Cretaceous pelagic organisms became extinct over a period of a few tens of thousands of years, and do not contradict the scenario of cometary impact as a cause of mass mortality in the oceans, as suggested by an iridium anomaly at the Cretaceous-Tertiary boundary. (Author)

**A82-28925 #** Fuselage lights as a cause factor of vertigo in night formation flight - Perceiving pattern of fuselage light. Z. Katoh (Japan Air Self-Defense Force, Aeromedical Laboratory, Tokyo, Japan). *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol. 22, Sept. 1981, p. 125-142. 25 refs. In Japanese, with abstract in English.

**A82-29153** A mathematical model of the dynamics of the inner ear. M. H. Holmes (Rensselaer Polytechnic Institute, Troy, NY). *Journal of Fluid Mechanics*, vol. 116, Mar. 1982, p. 59-75. 14 refs.

A three-dimensional hydroelastic model of the dynamical motion in the cochlea is analyzed. The fluid is Newtonian and incompressible, and the basilar membrane is modelled as an orthotropic elastic plate. Asymptotic expansions are introduced, based on slender-body theory and the relative high frequencies in the hearing range, which reduce the problem to an eigenvalue problem in the transverse cross-section. After this, an example is worked out and a comparison is made with experiment and the earlier low-frequency theory. (Author)

**A82-29168** A comparison of models to predict annoyance reactions to noise from mixed sources. S. M. Taylor (McMaster University, Hamilton, Ontario, Canada). *Journal of Sound and Vibration*, vol. 81, Mar. 8, 1982, p. 123-138. 25 refs. Research supported by the Social Sciences and Humanities Research Council of Canada.

Many residential communities are exposed to environmental noise from a mixture of sources. A simple energy summation model provides a convenient method for predicting annoyance reactions in mixed source situations but there is research evidence that the validity of its application is questionable. In this paper various alternative models are discussed. Their predictive powers are compared by using noise and social survey data collected at residential sites in the vicinity of Toronto International Airport. Sites were purposely selected to represent a range of aircraft and road traffic noise combinations. Of the five models examined, the simple energy summation model gives the poorest prediction of average annoyance. The strongest predictions are achieved by using independent effects and energy difference models. The implications of the results for predicting annoyance reactions to mixed sources are considered. (Author)

**A82-29255** An evaluation of the Nimrod Maritime Crew Trainer - A case study. A. G. Parfitt (Ministry of Defence, London, England). *Aeronautical Journal*, vol. 86, Mar. 1982, p. 86-89.

A description is given of the approach adopted and experience gained in the RAF Maritime Crew Trainer for the Nimrod MR1 aircraft, with attention to methodological and practical problems encountered. The Nimrod long-range maritime patrol and ASW aircraft is extensively equipped with electronic and acoustic sensors, and its simulator complex comprises two parts: (1) a dynamic simulator, which provides full flight deck simulation for two pilots and flight engineer and incorporates a three-degree-of-freedom motion system, and (2) the maritime crew trainer, which replicates the tactical compartment of the rear fuselage. The two parts may be operated independently or linked together. The areas for assessment of the simulations conducted included communications, tactical planning and tactical plan execution, on-task reactions, and crew cooperation. The two experimental variables were exercise frequency, and the provision of additional feedback to crews regarding their performance. O.C.

**A82-29256** An evaluation of some experimental data on the cost effectiveness of flight simulators. C. G. Durose (RAF, Support Command, Brampton, Cumb., England). *Aeronautical Journal*, vol. 86, Mar. 1982, p. 90-93. 6 refs.

The Incremental Transfer Effectiveness Function (ITEF) method for the measurement of flight simulator training effectiveness is discussed in light of two studies, by Povenmire and Roscoe (1973) and Bickley (1980), which employed it. A realistic mathematical function is fitted to the data reported in the former study, and total training cost sensitivity is investigated. Explanations are given for the successes and difficulties encountered in the attempt to obtain actual RAF aircraft and simulator operating costs. It is recommended that future studies along the lines of Povenmire and Roscoe obtain accurate operating costs, and identify cost effective training mixes and investigate the sensitivity of total training cost to changes in the optimum mix. O.C.

**A82-29257** The role of information feedback in aircrew training and its impact on the debriefing facilities. W. L. Waag (RAF Support Command, Brampton, Cumb., England). *Aeronautical Journal*, vol. 86, Mar. 1982, p. 94-96.

The role of information feedback in aircrew training is discussed, with attention to the need for improved computer-based

debriefing aids. Such debriefing systems must be able to recreate the salient events of a simulated sortie in an off-line mode, requiring no additional simulator time, and include crew actions, aircraft and systems responses to those actions, and the relationship of the simulated aircraft to its operational environment. In addition, the off-line replay facility should offer a range of data representation options involving both alphanumeric and graphic formats, and give the operating instructor the greatest possible flexibility in the selection and treatment of those portions of the sortie that he wishes to debrief, with freezes, speed-ups and slow-downs of the simulation.

O.C.

**A82-29266** † The medical and public health challenge of space. O. H. Loyd and K. J. O'Brien (Johns Hopkins University, Baltimore, MD). *Spaceflight*, vol. 24, May 1982, p. 205-207. 34 refs.

It is pointed out that the acquisition, monitoring, and interpretation of physiological processes during flight have generated many technical improvements in the quality and quantity of health care. The satellite monitoring of crops, ecological change, weather, and air and sea pollution is also cited as a tangible health benefit. Space biomedical research has led to laser surgical techniques, computer imaging, and the miniaturization of biomedical sensors. It is predicted that at medical facilities in space, which will be unencumbered by gravity and surrounded by the ultimate vacuum, new drugs, new medical and surgical techniques, and new research discoveries will occur.

C.R.

**A82-29432** † The mechanism of the interaction of the triplet state of porphyrins and phthalocyanines with electron acceptors (O mekhanizme vzaimodeistviia tripletnogo sostoiianiia porfirinov i ftalotsianinov s akseptorami elektronov). I. V. Renge, V. A. Kuz'min, A. F. Mironov, and Iu. E. Borisevich (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki; Moskovskii Institut Tonkoi Khimicheskoi Tekhnologii, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, Mar.-Apr. 1982, p. 143-146. 14 refs. In Russian.

**A82-29433** † Structural features of the receptor cells of the saccular macula of the common frog (Strukturnye osobennosti retseptornykh kletok sakkuliarnoi makuly travianoii liagushki). L. I. Tikhomirova (Akademiia Nauk SSSR, Institut Evoliutsionnoi Morfologii i Ekologii Zhivotnykh, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, Mar.-Apr. 1982, p. 197-200. 8 refs. In Russian.

**A82-29434** † The interaction of actin with phosphorylase kinase (Vzaimodeistvie aktina s kinazoi fosforilazy). B. F. Poglavov, N. B. Livanova, and M. V. Ostrovskaiia (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, Mar.-Apr. 1982, p. 221-224. 15 refs. In Russian.

An experimental study was performed to examine the effects of actin from rabbit skeletal muscles on the activity of phosphorylase kinase from rabbit muscles and liver. The results indicate that actin is a polyfunctional protein and is not only connected with the motor mechanism but has a more general significance in that it is a regulator of metabolic processes. In this regard, the polymerization capacity of actin is very important, since it makes possible a fine regulation of the quantity of its active form.

B.J.

**A82-29440** † Effects of reduced motor activity and water regimen on the growth of animals and their skeletal musculature (Vliianie ponizhennoi dvigatel'noi aktivnosti i vodnogo rezhima na rost zhivotnykh i ikh skeletnoi muskulatury). E. V. Kocherezhkina (Akademiia Nauk SSSR, Institut Evoliutsionnoi Morfologii i Ekologii Zhivotnykh, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 2, 1982, p. 457-459. 8 refs. In Russian.

**A82-29441** † Sensing of the proton potential /Delta mu H/ in *Halobacterium halobium* (Retseptsiia protonnogo potentsiala /Delta mu H/ u *Halobacterium halobium*). V. A. Baryshev, A. N. Glagolev, and V. P. Skulachev (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 2, 1982, p. 475-479. 15 refs. In Russian.

**A82-29442** † Linear dichroism of absorption changes upon the photoreduction of pheophytin in oriented preparations of photosystem II (Lineinyi dikhoizm izmenenii pogloscheniia pri fotovosstanovlenii feofitina v orientirovannykh preparatakh fotosi-

stemy II). I. B. Ganago, V. V. Klimov, A. O. Ganago, V. A. Shuvalov, and Iu. E. Erokhin (Akademiia Nauk SSSR, Institut Fotosinteza, Pushchino, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 2, 1982, p. 479-483. 15 refs. In Russian.

The linear dichroism of the light-induced changes in absorption observed upon the photoreduction of pheophytin, the primary electron acceptor in photosystem II reaction centers, in oriented subchloroplast particles is measured in a study of the orientation of the transition dipole moment of the pigment. Absorption spectra of subchloroplast particles enriched in photosystem II and oriented in a polyacrylamide gel were determined using a beam of linearly polarized light oriented parallel and perpendicular to the extension axis of the gel. Comparison of the absorption spectra for chloroplasts containing reversibly photoreduced pheophytin reveals the presence of two spectral components, corresponding to the reduction of pheophytin to the anion radical and to a shortwave shift in the maximum of chlorophyll absorption. The transition dipole moment of the longwave absorption band of pheophytin is deduced to be nearly perpendicular to the thylakoid membrane, while that of the 545-nm band is nearly parallel to the membrane.

A.L.W.

**A82-29443** † Orientation of Ca<sup>2+</sup>-dependent ATPases in sarcoplasmic reticulum membranes and reconstructed proteoliposomes (Orientatsiia Ca<sup>2+</sup>-zavisimoi ATFazy v membranakh sarkoplazmaticheskogo retikuluma i v rekonstruirovannykh proteoliposomakh). V. B. Ritov, M. K. Murzakmetova, and N. S. Shcherbakova (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 2, 1982, p. 483-487. 15 refs. In Russian.

**A82-29444** † The interaction of tubulin with G-actin (Vzaimodeistvie tubulina s G-aktinom). A. B. Verkhovskii, I. G. Surgucheva, V. I. Gel'fand, and V. A. Rozenblat (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 2, 1982, p. 488-490. 15 refs. In Russian.

The presence of actin-binding proteins in nonmuscular cells is investigated by means of affinity chromatography. Depolymerized actin from the skeletal muscle of the rabbit was immobilized on activated CNBr sepharose, then a solution of homogenized cattle brain extract was applied to the column. Elution of column-bound fractions with formamide produced fractions identified as tubulin as well as actin and other proteins. Purified tubulin is also found to interact with actin in solution, giving rise to a rapidly sedimenting form of actin. Results suggest the possibility of interactions between cellular microtubules, which are composed primarily of tubulin, and microfilaments, composed of actin.

A.L.W.

**A82-29445** † New data on reverse electron transport in the respiratory chains of yeast mitochondria - The induction of reverse transport by exogenous NADH (Novye dannye ob obratnom perenose elektronov v dykhatel'noi tsepi drozhzhevykh mitokhondrii - Induksiia obratnogo perenosa ekzogenym NADH). R. A. Zviagil'skaia, V. A. Zelenshchikova, D. Sh. Burbaev, and A. V. Kotelnikova (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 2, 1982, p. 491-493. 8 refs. In Russian.

**A82-29446** † Principles of enzyme stabilization - Polyacrylamide-gel-immobilized trypsin and chymotrypsin with high catalytic activity at elevated temperatures (Printsipy stabilizatsii fermentov - Immobilizovannye v poliakrilamidnom gele tripsin i khimotripsin, obladaiushchie vysokoi kataliticheskoi aktivnost'iu pri povyshennykh temperaturakh). K. Martinek, V. A. Shikshnis, V. V. Mozhaev, I. V. Berezin, V. N. Smirnov, and V. P. Torchilin (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 2, 1982, p. 494-497. 15 refs. In Russian.

**A82-29447** † Change in protein-lipid interactions upon the peroxide oxidation of blood serum lipoproteins (Izmenenie belok-lipidnykh vzaimodeistvii pri perekisnom okislenii lipoproteidov syvorotki krovi). V. E. Formaziuk, Iu. G. Osis, A. I. Deev, V. Z. Lankin, A. M. Vikhert, and Iu. A. Vladimirov (II Moskovskii Meditsinskii Institut; Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 2, 1982, p. 497-500. 14 refs. In Russian.

**A82-29448 †** Electrical stimulation of the exterior geniculate body induces eye movements (Elektricheskaia stimuliatsiia naruzhnogo kolenchatogo tela vyzvaet dvizheniia glaz). V. Ia. Svetlova, G. I. Novikov, and N. F. Podvigin (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 2, 1982, p. 507-509. 5 refs. In Russian.

**A82-29469 †** A stochastic model of a human operator in the manual control of a dynamic system (Ob odnoi stokhasticheskoi modeli cheloveka-operatora v konture ruchnogo upravleniia dinamicheskimi ob'ektom). I. V. Kurochkin and A. A. Mal'tsev (Gor'kovskii Gosudarstvennyi Universitet, Gorki, USSR). *Radiofizika*, vol. 25, no. 1, 1982, p. 60-70. 11 refs. In Russian.

A stochastic model of a manual control loop is proposed which assumes that the human operator (operating like a Kalman filter) can, within certain limits, adapt the gain coefficient and the time constant of the neuromuscular system to the parameters of the dynamic system and the environment. It is also assumed that the selection by the operator of the optimal parameters of the neuromuscular system is accomplished in accordance with the operator's proper functional performance criterion, which reflects requirements imposed on the stabilization of the system coordinates, the intensity of the operator's controlling actions, and the total control-related energy expenditure of the loop. The statistically optimal stabilization of a first-order dynamic system is considered as an example. B.J.

**A82-29551** Chylomicron triglyceride metabolism in resting and exercising fed dogs. R. L. Terjung, L. Budohoski, K. Nazar, A. Kobryn, and H. Kaciuba-Uscilko (Polish Academy of Sciences, Medical Research Centre, Warsaw, Poland). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 815-820. 23 refs.

Plasma triglyceride turnover and tissue uptake during periods of moderate exercise is investigated in dogs performing treadmill exercise after eating a meal high in corn oil. Plasma triglyceride turnovers were determined from the loss from the circulating plasma of (C-14)-palmitic acid-labeled chylomicron triglycerides injected prior to a 60-min treadmill run. Both during exercise and at rest, labeled triglyceride removal from the blood is found to conform to first-order kinetics, although the fractional removal rate was slightly greater during exercise. Fat and muscle biopsies show that, during rest, the uptake of the triglyceride by fat tissue was nearly five times greater than that by muscle, while during exercise triglyceride uptake was very similar in muscle and fat due to a significant increase in muscle uptake and a large but insignificant decrease in uptake by fat. Results suggest that circulating triglycerides could represent a potential source of fatty acids for beta oxidation in working muscle. A.L.W.

**A82-29552** Respiratory muscle fatigue after marathon running. J. Loke, D. A. Mahler, and J. A. Virgulto (Yale University, New Haven, CT). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 821-824. 27 refs.

The present investigation has the objective to evaluate respiratory muscle function in runners before and after completion of a marathon race. Respiratory muscle strength was assessed by measuring maximal inspiratory and expiratory pressures and transdiaphragmatic pressure during inspiratory capacity. Endurance of the respiratory system was determined by measuring maximal voluntary ventilation. Four healthy male subjects were used in the study. The results demonstrate that both strength and endurance characteristics of the respiratory muscles were decreased following completion of a marathon race. Although the mechanism for these changes is unclear, it is likely that the development of respiratory muscle fatigue may represent a more general muscular fatigue experienced with endurance exercise. G.R.

**A82-29553** Acclimatization to dry heat - Active men vs. active woman. D. H. Horstman and E. Christensen (U.S. Army, Research Institute of Environmental Medicine, Natick, MA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 825-831. 26 refs.

Six male and four female volunteers, who were unacclimatized to heat, served as subjects for the considered study. It was found that

active women perform exercise of equal relative intensity in dry heat as well as active men. Moreover, active women acclimatized to exercise of equal relative intensity in dry heat at a faster rate to a greater extent than did active men. Ventilatory, metabolic, and cardiovascular differences between the sexes were minimal, and these measures were relatively stable throughout exercise on each day and among the days of acclimatization. Changes in plasma volume did not play a role in the acclimatization process for these active subjects. G.R.

**A82-29554** Respiratory mechanics of a small carnivore - The ferret. A. Vinegar, E. E. Sinnett, and P. C. Kosch (Harvard University, Boston, MA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 832-837. 19 refs. Grants No. NIH-HL-07118; No. NIH-HL-17382.

**A82-29555** Thermal insulation and shivering threshold in Greek sponge divers. A. Veicsteinas (Milano, Università, Milan, Italy) and D. W. Rennie (New York, State University, Buffalo, NY). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 845-850. 17 refs. Research supported by the Consiglio Nazionale delle Ricerche; Grant No. NIH-P01-HL-14414.

**A82-29556** Sparing effect of chronic high-altitude exposure on muscle glycogen utilization. A. J. Young, W. J. Evans, A. Cymerman, K. B. Pandolf, J. J. Knapik, and J. T. Maher (U.S. Army, Research Institute of Environmental Medicine, Natick; Boston University, Boston, MA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 857-862. 31 refs.

The results of the discussed investigation indicate that after chronic altitude exposure, there is increased mobilization and utilization of free fatty acids (FFA) during exercise with associated sparing of muscle glycogen. These changes in metabolism during exercise may account for large increases in endurance observed during the first weeks at high altitude. Additional studies are recommended to determine whether this adaptation persists upon return to sea level. Eight healthy male soldiers participated in the investigation as subjects. Attention is given to resting serum FFA, serum lactate, glycerol, and aspects of glycogen utilization. G.R.

**A82-29557** Role of the carotid chemoreceptors in regulation of inspiratory onset. G. Bowes, S. M. Andrey, L. F. Kozar, and E. A. Phillipson (Toronto, University, Toronto, Canada). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 863-868. 30 refs. Medical Research Council of Canada Grant No. MT-4606.

The present investigation has the objective to demonstrate the ability of the carotid chemoreceptors to mediate independent changes in expiratory time in the unanesthetized, spontaneously breathing dog. It is found that during vagal blockade a transient CO<sub>2</sub> stimulus of small magnitude is able to advance the onset of inspiration and thus shorten expiratory time, independent of changes in tidal volume or inspiratory time. It is further shown that this effect is abolished following carotid body denervation. Five dogs were used in the investigation. The dogs had been prepared previously with both a permanent side-hole tracheostomy and bilateral cervical vagal loops. G.R.

**A82-29558** Determination of the anaerobic threshold by a noninvasive field test in runners. F. Conconi, M. Ferrari, P. G. Ziglio, P. Droghetti, and L. Codeca (Ferrara, Università; Arcispedale Sant'Anna, Ferrara, Italy). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 869-873. 26 refs.

**A82-29559** Effect of upper body posture on forced inspiration and expiration. F. Haas, M. Simnowitz, K. Axen, D. Gaudino, and A. Haas (New York University, New York, NY). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 879-886. 28 refs. U.S. Rehabilitation Services Administration Grant No. 16-P-56081/2.

**A82-29560** Time course of ultrastructural changes in skeletal muscle after two types of exercise. M. A. Nimmo and D. H.



Snow (Glasgow, University, Glasgow, Scotland). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 910-913. 19 refs. Research supported by the Horserace Betting Levy Board.

To ascertain the effects of sprint and endurance exercise on the time course of skeletal muscle mitochondrial changes, an ultrastructural study was conducted on four Thoroughbred horses. Skeletal muscle biopsies were taken at various intervals during and after the exercise. Transient mitochondrial alterations of varying degrees were observed following both types of exercise and were considered to be related to the development of fatigue. The degree of distortion of mitochondrial structure is considered not to represent the in vivo condition but the state of responsiveness to the fixation medium.

(Author)

**A82-29561** Delayed kinetics of respiratory gas exchange in the transition from prior exercise. R. L. Hughson and M. Morrissey (Waterloo, University, Waterloo, Ontario, Canada). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 921-929. 30 refs. Research supported by the Natural Sciences and Engineering Research Council of Canada.

**A82-29562** Hemodynamic responses to methoxamine in exercise-conditioned and aorta-constricted rats. E. M. Hassler, R. T. Dowell, and J. L. Haithcoat (Oklahoma, University, Oklahoma City, OK). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 967-975. 28 refs. Grants No. NIH-HL-23025; No. NIH-HD-13127; No. NIH-HL-07430.

The results of the reported experiments illustrate the divergent hemodynamic responses of cardiovascular systems in exercise-conditioned and aorta-constricted animals when subjected to methoxamine administration. Major alterations seem to lie in the ability to maintain cardiac output in the face of increasing peripheral resistance. Directionally opposite hemodynamic results occur in exercise-conditioned and aorta-constricted animals when subjected to identical cardiovascular stresses. Experiments that amalgamate these two conditions, i.e., exercise conditioning and aortic constriction, should provide mechanistic identification of the beneficial cardiovascular effects of repetitive exercise.

G.R.

**A82-29563** Adaptive changes in cats after long-term exposure to various temperatures. H. Hensel and M. Banet (Marburg, Universität, Marburg, West Germany). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 1008-1012. 19 refs. Research supported by the Deutsche Forschungsgemeinschaft.

Physiological and morphological adaptations developing upon prolonged exposure to the heat or the cold are investigated in cats exposed to 5 and 30 C for periods of over a year. Two groups of animals were first exposed to 5 or 30 C for 24 months, then the groups were switched and exposed to the alternative temperature for 36 months. Following the 36-month adaptation period, the cold-adapted cats showed increased fur growth and resting metabolic rates, a lowered threshold to the cold-induced metabolic response, and greater fur insulation at thermoneutrality than the warm-adapted cats. During acute exposure to -5 C, tissue insulation decreased in both groups, although fur insulation increased only in the warm-adapted cats. Norepinephrine given at thermally neutral ambient temperatures elicited nonshivering thermogenesis only in the cold-adapted animals. Despite the higher metabolic rate in the cold-adapted animals, body weights did not differ between the groups, due to a corresponding increase in food consumption by the cold-adapted animals.

A.L.W.

**A82-29564** Effect of acid-base status on the kinetics of the ventilatory response to moderate exercise. A. Oren, B. J. Whipp, and K. Wasserman (California, University, Medical Center, Torrance, CA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 1013-1017. 19 refs. Grants No. NIH-HL-11907; No. NIH-HL-07388.

An investigation was conducted to determine if an induced metabolic acidosis would speed the ventilatory kinetics during moderate muscular exercise and, conversely, whether metabolic alkalosis would slow the response. Five healthy male volunteers were studied. The obtained results demonstrate that metabolic acidosis,

which is known to stimulate the carotid bodies, decreased the time constant of the ventilatory response to exercise during air breathing, whereas metabolic alkalosis appeared to slow the ventilatory response, although this did not attain statistical significance.

G.R.

**A82-29565** Body fluid and hematologic adjustments during resting cold acclimation in rhesus monkey. I. R. Oddershede and R. S. Elizondo (Indiana University, Bloomington, IN). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 1024-1029. 20 refs. Grants No. NIH-AM-16703; No. NIH-AM-00061.

**A82-29566** No effect of naloxone on hypoxia-induced ventilatory depression in adults. S. Kagawa, M. J. Stafford, T. B. Waggner, and J. W. Severinghaus (California, University, San Francisco, CA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 1030-1034. 28 refs.

**A82-29567** Functional diagrams of flow and volume for the dog's lung. D. S. Moffatt, A. C. Guyton, and T. H. Adair (Mississippi, University, Medical Center, Jackson, MS). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 1035-1042. 12 refs. Grant No. NIH-HL-11678.

**A82-29568** Theoretical analysis of optimal P50. D. C. Willford, E. P. Hill, and W. Y. Moores (California, University, La Jolla; U.S. Veterans Administration Medical Center, San Diego, CA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 1043-1048. 25 refs. Research supported by the U.S. Veterans Administration; Grants No. NIH-5-1-32-HL-07212-05; No. NIH-HL-17731; No. NIH-K04-HL-00418.

A simple expression is derived to describe the partial pressure at 50% hemoglobin saturation with oxygen (P50) that maximizes venous oxygen tension -  $P(O_2)$  - for a given arterial  $P(O_2)$  and oxygen consumption. That 'optimal P50' also maximizes arterio-venous saturation differences for given arterial and venous  $P(O_2)$  values. The optimal P50 can be expressed as the square root of the product of arterial and venous  $P(O_2)$  values. Alternatively, it can be expressed as a simple function of the arterial  $P(O_2)$  and the arteriovenous saturation difference. Nomograms summarize the relationships between the variables, and published observations that suggest an observational basis for theoretical analysis are reviewed. It is concluded that for normoxia or moderate hypoxia a high P50 is advantageous, whereas for more severe hypoxia or increased metabolic demands, a low P50 is advantageous.

(Author)

**A82-29569** Adjustments in metabolic heat production by squirrel monkeys exposed to microwaves. E. R. Adair (John B. Pierce Foundation Laboratory, New Haven, CT) and B. W. Adams (Yale University, New Haven, CT). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 1049-1058. 31 refs. Grant No. AF-AFOSR-77-3420.

The basic fact that microwave exposure can lower metabolic heat production has been previously demonstrated for the mouse by Ho and Edwards (1977) and for the rat by Phillips et al. (1975). The general conclusion drawn from both studies was that the metabolic reduction produced by microwave exposure was dose dependent. The present study extends the investigation into the effects of microwave exposure on metabolic heat production to a primate, the squirrel monkey. When squirrel monkeys are restrained in cool environments, body temperature is regulated by an increase in metabolic heat production. The results of the current study demonstrate that either brief or prolonged whole-body exposure to a microwave field will cause a reduction of this elevated heat production by an amount directly related to the microwave energy absorbed.

G.R.

**A82-29570** Lipoprotein lipase hydrolyzes endogenous triacylglycerols in muscle of exercised rats. L. B. Oscai, R. A. Caruso, and A. C. Wergeles (Illinois, University, Chicago, IL). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 1059-1063. 45 refs. Grants No. NIH-AM-17357; No. NIH-K04-AM-00216; No. NIH-HD-10987.

**A82-29571** Comparative physiological responses to exercise stress. A. B. Hastings, F. C. White, T. M. Sanders, and C. M. Sloor (California, University, La Jolla, CA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 1077-1083. 26 refs. Grants No. NIH-HL-17682; No. NIH-HL-07104.

Experiments to determine the effect of exhaustive exercise on the acid-base balance, O<sub>2</sub> consumption, and cardiac output in dogs and pigs are described, along with possible applications of the results for humans. Eleven dogs and 11 Yucatan miniswine were subjected to treadmill exercise with silastic catheters implanted in the aortic arch and right ventricle. Work output, cardiac output, heart rate, blood constituents, aortic pressure, blood gas tensions, hematocrit, and plasma lactic acid were monitored. The animals were run to exhaustion on the machine in peak and steady-state exercise modes. Dogs displayed a greater work capacity than the pigs but could not sustain maximal capacity as long. A similarity was observed between metabolic acidosis in the pigs and previous human results, an occurrence that corresponded with exhaustion. O<sub>2</sub> correlations were also present, and the data suggested that pigs and humans can perform more work with less O<sub>2</sub> than can dogs. It is recommended that future endurance testing of animals as an indicator of human performance be carried out with pigs. M.S.K.

**A82-29572** Chemoreceptor involvement in cortisol responses to hypoxia in ventilated dogs. H. Raff, S. P. Tzankoff, and R. S. Fitzgerald (Johns Hopkins University; National Institutes of Health, National Institute of Aging, Baltimore, MD). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 52, Apr. 1982, p. 1092-1096. 14 refs. Grants No. NIH-HL-10342; No. NIH-HL-07199.

Changes in cortisol secretion rate (CSR) in response to hypoxic hypoxia (HH) and to carbon monoxide hypoxia (COH) were assessed in mongrel dogs that had intact chemoreceptors (INT); surgically deafferented carotid bodies (CBD) or aortic bodies (ABD); or both carotid and aortic chemoreceptors denervated (SAD). All dogs were anesthetized, paralyzed, ventilated, and maintained normocapnic. In the INT and ABD groups, CSR responded 'maximally' to HH, whereas in CBD and SAD animals, the CSR was attenuated but not eliminated. COH, which does not stimulate the carotid body, caused a submaximal increase in CSR regardless of chemoreceptor status. It is concluded that (1) the carotid bodies are the principal chemoreceptor influence on CSR during HH and (2) there is a nonchemoreceptor-mediated increase in CSR during hypoxia.

(Author)

**A82-29574** NMR imaging in medicine. I. L. Pykett. *Scientific American*, vol. 246, May 1982, p. 78-88.

The theoretical and experimental foundations of nuclear magnetic resonance (NMR) for medical diagnosis are explored. Atomic nuclei possess electric charge which generates a magnetic field, and nuclei with a net zero detectable spin have an associated dipole, while uneven numbered nucleon atoms exhibit spin and can be detected by NMR spectroscopy. The measurement of the bulk magnetic field of an object immersed in a magnetic field and then subjected to another magnetic field at right angles to the first yields a relationship between the Larmor frequency, the natural precessional frequency of the bulk nuclei, and the field strength, which is unique for each atomic species. Tipping the bulk magnetization vector results in a rise of the energy levels of the nuclei, which releases an electromotive signal. Application to human internal imaging is enhanced by the fact that humans are 75% water, and therefore have many hydrogen atoms. Exact conversion of the signal to an image is outlined, and the characterization of healthy NMR responses for later detection of disease onset is described. M.S.K.

**A82-29671 \*** A model of human decisionmaking in multiple process monitoring situations. J. S. Greenstein (Virginia Polytechnic Institute and State University, Blacksburg, VA) and W. B. Rouse (Georgia Institute of Technology, Atlanta, GA). *IEEE Transactions on Systems, Man, and Cybernetics*, vol. SMC-12, Mar.-Apr. 1982, p. 182-193. 17 refs. Grant No. NSG-2110.

It is proposed that human decisionmaking performance in multiple process monitoring situations can be modeled in terms of the detection of process related events and the allocation of attention among processes once events are felt to have occurred. An

elementary pattern recognition technique, discriminant analysis, is used to generate estimates of event occurrence probability. A queueing theory framework is then utilized to incorporate these probabilities as well as other task characteristics into the solution of the attention allocation problem. The performance of the model is compared with that of subjects in two experiments. (Author)

**A82-29672** Scheduling of parallel computation for a computer-controlled mechanical manipulator. J. Y. S. Luh and C. S. Lin (Purdue University, West Lafayette, IN). *IEEE Transactions on Systems, Man, and Cybernetics*, vol. SMC-12, Mar.-Apr. 1982, p. 214-234. 18 refs. NSF Grant No. APR-77-14533.

The physical compactness of the microcomputer has made it feasible to mount the controller and the mechanical manipulator together as a single unit. By using a computer with multiple central processing units (CPU's), parallel computations may be executed to achieve a minimum computing time so that a real-time control is possible. The parallel processing system utilizes one CPU for each link of the manipulator. Because of the dynamic coupling between adjacent links, precedence relations appear among the subtasks to be executed in CPU's. Under the series-parallel precedence constraints a method of 'variable' branch-and-bound has been developed which determines an optimum ordered schedule for each of the CPU's. It consists of, alternatively, forward and backward search procedures with an aid of pushdown-stacks. In each forward search procedure, it seeks the currently feasible schedule with shorter computing time which updates the upper bound of the optimum schedule, while in each backward search procedure it discards those schedule-branches that will not provide improvements. A Fortran program has been written for a manipulator based on the Newton-Euler formulation of dynamic equations and is applied to the Stanford manipulator as an illustration. (Author)

**A82-29697 †** Regional redistribution of blood flow in the cat under conditions of high ambient temperature (Regionarnoe pereraspredelenie krovotoka u koshek v usloviakh vysokoi vneshnei temperatury). G. F. Sultanov, D. P. Dvoret'skii, R. L. Nadyrshin, and B. I. Tkachenko (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Mar. 1982, p. 385-390. 10 refs. In Russian.

**A82-29698 †** Mechanism for the change in pulmonary blood volume upon the stimulation of the vagosympathetic trunk (Mekhanizm izmeneniia ob'ema krovi v dole legkogo pri razdrzhenii vagosimpaticheskogo stvola). L. P. Kuz'minykh and B. I. Mazhbich (Akademiia Meditsinskikh Nauk SSSR, Novosibirsk, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Mar. 1982, p. 399-404. 20 refs. In Russian.

**A82-29699 †** Comparative characteristics of respiratory and circulatory changes upon acute hyperthermia in cats (Sravnitel'naia kharakteristika izmenenii dykhanii i krovoobrashcheniia pri ostroi gipertemii u koshek). V. A. Tashliev and D. P. Dvoret'skii (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Mar. 1982, p. 405-410. 12 refs. In Russian.

**A82-29806 †** Disclosure of the complex structure of the absorption spectrum of bacteriorhodopsin (Obnaruzheniie slozhnoi struktury spektra pogloshcheniia bakteriorodopsina). N. V. Korneeva, S. P. Balashov, and F. F. Litvin (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 3, 1982, p. 725-729. 12 refs. In Russian.

**A82-29807 †** The relationship between circadian and circadian rhythms of some parameters of the heart contractile function and vascular tension (O vzaimootnoshenii tsirkadiannykh i tsirkannykh ritmov nekotorykh pokazatelei sokratitel'noi funktsii serdtsa i sosudistogo tonusa). V. A. Frolov, S. M. Chibisov, T. A. Kazanskaia, L. V. Efimova, and E. V. Tsvireva (Universitet Druzhby Narodov, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 3, 1982, p. 753-756. 11 refs. In Russian.

**A82-29816 †** Effects of reversible manganese extraction on the light reactions of photosystem II preparations (Deistvie obratimoi ekstraktsii margantsa na svetovye reaktsii preparatov fotosi-

stemy II). V. V. Klimov, S. I. Allakhverdiev (Akademiia Nauk SSSR, Institut Fotosinteza, Pushchino, USSR), V. A. Shuvalov, and A. A. Krasnovskii (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 4, 1982, p. 1001-1005. 15 refs. In Russian.

The role of manganese ions in the photoreduction of Q, the primary electron acceptor in the electron transport chain of photosystem II, is investigated. Preparations of pea chloroplast fragments were treated to remove up to 95% of the manganese contained within them, and photosystem II activity was evaluated according to the magnitude of reversible changes in chlorophyll fluorescence connected with the photoreduction of Q. The extraction of manganese is observed to lead to a suppression of photoinduced fluorescence changes which may be restored by the addition of micromolar amounts of Mn (+2) ions or 10 to the -8th molar amounts of MnCl<sub>2</sub> in combination with various divalent metal ions. The amount of MnCl<sub>2</sub> required corresponds to one atom of Mn per 110 chlorophyll molecules, or two atoms per one reaction center. Results indicate reactivation to be connected with the formation of stable Mn complexes in photosystem II active structures, which are capable of undergoing multiple reduction. A.L.W.

**A82-29817 †** The damaging effects of light on the retina - The role of singlet oxygen and lipid peroxides (Povrezhdaiushchee deistvie sveta na setchatku - Uchastie singletnogo kisloroda i perekisei lipidov). I. Ia. Kuliev, A. A. Shvedova, V. E. Kagan, A. A. Krasnovskii, and Iu. P. Kozlov (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 4, 1982, p. 1005-1009. 10 refs. In Russian.

The effects of singlet oxygen generated by exogenous or endogenous retinal or an alternative exogenous source on retinal electrical activity and on the generation of peroxidized lipids in the photoreceptor membrane are investigated in a study of a possible mechanism for photoinduced retinal damage. Electroretinograms of isolated frog retinas in the presence of endogenous retinal or the photosensitizers methylene blue or trans-retinal show a decline in electrical activity following illumination. The addition of a quencher of singlet oxygen or inhibitors of free-radical oxidation is found to prevent the photosensitized damage to the retina whatever the photosensitizer. Results thus support a mechanism of photoinduced retinal damage involving the photoinduced conversion of rhodopsin to retinal and singlet oxygen, which then acts in the peroxidation of membrane lipids causing retinal damage. A.L.W.

**A82-29989** Etiological aspects of in-flight discomforts (Aspects étiologiques des malaises en vol). G. Leguay (Hôpital d'Instruction des Armées Dominique Larrey, Versailles, France). (*Journées Cliniques de Médecine Aéronautique, Versailles, France, Dec. 5, 6, 1980.*) *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 20, 3rd Quarter, 1981, p. 267-277. 8 refs. In French.

The statistical distributions and possible etiologies of non-incapacitating in-flight discomfort experienced by flight personnel are discussed. The unreliability of frequency statistics for in-flight discomfort is noted, and distributions of these events with respect to aircrew age, flight experience, and flight specialty are examined. The symptomatology of in-flight discomforts, which take the forms of alterations in higher functions, psychological manifestations, behavior problems, asthenia, and sensory, cardiovascular, respiratory, digestive and nociceptive manifestations, is briefly reviewed, and the types of discomforts to which pilots are susceptible are indicated. Attention is then given to aeronautical factors, organic human factors, functional human factors including the tri-syndrome of vagotonia, spasmophilia and hypoglycemia, and psychological factors as agents important in the development of symptoms. The importance of multiple causative factors is emphasized, and the underlying physiological and psychological maladaptations giving rise to the observed syndromes are discussed. A.L.W.

**A82-29990** Diabetes mellitus and the examination of flight personnel (Diabète sucré et expertise du personnel navigant). A. Didier (Hôpital d'Instruction des Armées Val-de-Grâce, France). (*Journées Cliniques de Médecine Aéronautique, Versailles, France, Dec. 5, 6, 1980.*) *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 20, 3rd Quarter, 1981, p. 282-286. 18 refs. In French.

Questions of the initial selection and subsequent flight qualifications of flight personnel with diabetes mellitus are addressed. Hyperglycemic effects of the flight environment are examined. Attention is then given to the methods used by the French Air Force for the detection of diabetes in flight personnel, the prevalence of diabetes thus detected, which is significantly less than in the general population, and to the general characteristics of diabetic pilots, and techniques to be used to improve the detection of diabetic angiopathy are suggested. The influence of diabetes mellitus on the flight aptitude of air force personnel is then discussed, and the policy adopted in 1974 is reviewed, in which diabetes upon initial flight examination is disqualifying, however that developing during one's career is only disqualifying if it involves dangerous or inconvenient treatments or complications affecting aptitude. A.L.W.

**A82-29991** Diabetes and flight personnel - Ophthalmologic aspects (Diabète et personnel navigant - Aspects ophtalmologiques). J. P. Chevaleraud (Service de Santé des Armées, Paris, France). (*Journées Cliniques de Médecine Aéronautique, Versailles, France, Dec. 5, 6, 1980.*) *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 20, 3rd Quarter, 1981, p. 286-289. 5 refs. In French.

The role of the ophthalmologist in the detection and surveillance of flight personnel with diabetes is discussed. Diabetes is sometimes detected during regular ophthalmologic examinations or on the occasion of diabetic complications, and is evidenced by retinopathy involving microaneurisms, arterial and venous modifications, vascular proliferation originating at a vein, and signs of retinal injury including exudates, edema and hemorrhages. Paraclinical evaluation and surveillance methods for diabetics most frequently include fluorescein angiography, electrophysiological techniques, and tests of color perception, the central visual field, and glare sensitivity. By these means, the aeronautical ophthalmologist plays an important role in the determination of the flight qualifications of a diabetic aircrew member. A.L.W.

**A82-29992** Sarcoidosis and aeronautical aptitude (Sarcoidose et aptitude aéronautique). A. Seigneure, G. Leguay (Service de Santé des Armées, Paris, France), and J. de Bourayne (Hôpital des Armées, Paris, France). (*Journées Cliniques de Médecine Aéronautique, Versailles, France, Dec. 5, 6, 1980.*) *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 20, 3rd Quarter, 1981, p. 290, 291. In French.

Problems posed by sarcoidosis for the aeronautical aptitudes of flight personnel are discussed. Localizations of the granulomatous lesions which are well tolerated and pose no particular problems for prognosis or aptitude, such as cutaneous, hepatosplenic, peripheral ganglionic, osteoarticular or parotidian sites, are distinguished from those localizations embodying major risks to aptitude or life: pulmonary, nervous, ocular and cardiac sites and hypercalcemia. The questions of corticoid treatment and the consequent loss of flight aptitude are considered, and three stages at which a decision as to flight aptitude may be taken are distinguished. Finally, attention is given to possible techniques which may be used for the detection of latent lesions, which include electroencephalography and cerebral scintigraphy in the case of cerebral localizations, and continuous ambulatory electrocardiography, echocardiography and thallium scintigraphy in the case of cardiac localizations. A.L.W.

**A82-29993** Current clinical approaches to mediastino-pulmonary sarcoidosis (Approches actuelles de la sarcoidose médiastino pulmonaire en clinique). J. Kermarec (Hôpital d'Instruction des Armées Percy, Clamart, Hauts-de-Seine, France), G. Hagenauer, D. Dormont, P. Allard, J. Heyraud, and P. Laffargue. (*Journées Cliniques de Médecine Aéronautique, Versailles, France, Dec. 5, 6, 1980.*) *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 20, 3rd Quarter, 1981, p. 292-294. In French.

The clinical management of mediastino-pulmonary sarcoidosis is discussed in view of the frequency of this localization of the disease. Situations requiring histological confirmation of the diagnosis are pointed out, and the prognosis of the disease with and without corticosteroid therapy is considered. Indications for treatment are then discussed, with particular attention given to immunological depression, pulmonary lymphocytic activity, angiotension conversion enzyme levels and results of gallium-67 scintigraphy. It is noted that such techniques allow the close monitoring of the progress of the

disease as well as rational decisions with respect to therapy and patient capabilities. A.L.W.

**A82-29994** Spontaneous pneumothorax in a military environment (Le pneumothorax spontané en milieu militaire). G. Haguenaer, J. Kermarec, P. Allard, B. Epardeau, X. Foullon, and J. D. Heyraud (Hôpital d'Instruction des Armées Percy, Clamart, Hauts-de-Seine, France). (*Journées Cliniques de Médecine Aéronautique, Versailles, France, Dec. 5, 6, 1980.*) *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 20, 3rd Quarter, 1981, p. 294-297. In French.

The distribution, diagnosis, etiology and treatment of cases of spontaneous pneumothorax observed at a military hospital are discussed. Spontaneous pneumothorax is found to be more frequent in males aged 20-30, even when accounting for the age and sex composition of military personnel, and more often encountered during the winter. Most of the cases are accounted for by benign idiopathic pneumothorax, in patients of anthropometric indices characteristic of Marfan's syndrome, and did not occur subsequent to exertion. Radiology showed an equal distribution between the left and right lungs, a plurality of total pneumothorax over apical and parietal, and various radiological anomalies. Surgical intervention was necessary in 55 of the 123 cases seen, due to a recurrence of the condition following conservative treatment. Post-operative respiratory functions were found to be normal following a period of four months, and a recurrence was found in only one patient. A.L.W.

**A82-29995** Idiopathic spontaneous pneumothorax and the examination of flight personnel (Pneumothorax spontané idiopathique et expertise du personnel navigant). J. Droniou (Hôpital d'Instruction des Armées Val-de-Grâce, France). (*Journées Cliniques de Médecine Aéronautique, Versailles, France, Dec. 5, 6, 1980.*) *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 20, 3rd Quarter, 1981, p. 297-300. In French.

The etiology of idiopathic spontaneous pneumothorax is examined and discussed in relation to its occurrence in flight personnel. The pathogenesis of the apical pulmonary bubbles giving rise to the condition is considered, and mechanical and ischemic factors influencing the generation of the lesions are pointed out. Attention is then given to the frequency of idiopathic spontaneous pneumothorax in the aviation environment, the aeronautical factors influencing its onset, its incidence under flight conditions, which is unexpectedly low, and the question of recurrences, which occur in about 20 percent of the cases. The management of pneumothorax cases in flight personnel is then discussed, and the advantages of the surgical creation of a solid symphysis in preventing recurrences are pointed out. A.L.W.

**A82-29996** Sickle cell anemia and aviation (Drépanocytose et aviation). G. Leguay and A. Vauzelle (Hôpital d'Instruction des Armées Dominique Larrey, Versailles, France). (*Journées Cliniques de Médecine Aéronautique, Versailles, France, Dec. 5, 6, 1980.*) *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 20, 3rd Quarter, 1981, p. 304-308. In French.

Problems associated with the onset of sickling of the red blood corpuscles leading to thrombotic accidents under flight conditions in persons with sickle cell anemia are discussed. Clinical aspects of in-flight sickle-cell accidents are reviewed, with attention given to their frequency, age and sex distributions, flight conditions and types of hemoglobinopathies, pathology and outcome. The role of hypoxia in the induction of sickling and clinical manifestations observed in flight is examined based on observations of actual cases and pressure chamber simulations, in which a close relation between altitude and the risk of an accident has not been established, and flight factors other than hypoxia implicated in sickling are indicated. Recommendations concerning the flight qualification of homozygotic and heterozygotic carriers of the disease and the in-flight treatment and prevention of sickle-cell accidents are then presented. A.L.W.

**A82-29997** Sequelae of spinal column traumas in aeronautical medicine (Les séquelles des traumatismes de la colonne vertébrale en médecine aéronautique). R. P. Delahaye, R. Auffret, P. J. Metges, Mr. Chauvet, and A. Leger (Hôpital d'Instruction des Armées Dominique Larrey, Versailles; Hôpital d'Instruction des Armées Begin, Saint-Mandé, Val-de-Marne; Centre d'Essais en Vol, Brétigny-sur-Ogère, Essonne; Service de Santé des Armées, Paris,

France). (*Journées Cliniques de Médecine Aéronautique, Versailles, France, Dec. 5, 6, 1980.*) *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare*, vol. 20, 3rd Quarter, 1981, p. 309-312. In French.

The etiology of and clinical manifestations of sequelae to spinal traumas suffered by persons engaging in aeronautical activities are examined. The majority of back traumas is noted to occur during emergency operations, particularly crash or forced landings, parachuting, ejection or rapid vibratory phenomena in fighter aircraft, with each situation exhibiting characteristic sets of localizations. Persons with these various types of back injuries fall into four categories: (1) those for which the spinal fracture is not detected, who exhibit localized back pain 3-6 months after the accident; (2) those with recognized and treated fractures presenting tardive pain upon resumption of flight activities; (3) those experiencing pain in the absence of clinical or radiological findings; and (4) those operated on for lumbar disk hernias or fractures. A.L.W.

**A82-30026** † In the struggle for the health of sailors (V bor'be za zdorov'e moriakov). B. G. Makarenko. *Voenno-Meditsinskii Zhurnal*, Feb. 1982, p. 7, 8. In Russian.

Activities undertaken by the medical personnel of the Pacific fleet ensuring the maintenance of sailor health are discussed. Attention is given to the duties of the ship's doctor, and to the support provided by the naval medical service in the forms of equipment, training and continuing education. The role of the medical advisory group, consisting of medical specialists from hospitals, the naval medical commission and hygiene and epidemiologic establishments, is also noted. A.L.W.

**A82-30027** † Effects of ascorbic acid on the elevation of human cold tolerance (Vlianie askorbinovoi kisloty na povyshenie ustoichivosti cheloveka k kholodu). V. P. Kovalenko and V. V. Pastukhov. *Voenno-Meditsinskii Zhurnal*, Feb. 1982, p. 42, 43. 9 refs. In Russian.

**A82-30028** † Use of an active orthostatic test in aeromedical examinations (Ispol'zovanie aktivnoi ortostaticheskoi proby v praktike vrachebno-letnoi ekspertizy). V. D. Vlasov, I. G. Dlusskaia, and A. S. Nekhaev. *Voenno-Meditsinskii Zhurnal*, Feb. 1982, p. 44-46. 13 refs. In Russian.

The suitability of an active orthostatic test as a method for the determination of individual cardiovascular functional characteristics is studied. Orthostatic tolerances were determined in the morning in 12 healthy men by an active orthostatic test, in which arterial pressure was determined by the auscultatory method in the lying position and following the assumption of a standing position, and by a passive test on a tilt table with measurements by tachoscillography of the brachial artery, sphygmogrammetry of the radial artery and electrocardiography. Whereas responses to the passive orthostatic test clustered around a value of 6.9 for the orthostatic index, a greater variability in responses to the active orthostatic test was found. Subsequent evaluation of physiological parameters during a passive orthostatic test conducted during the optimal working period of the day confirmed preliminary indications of a lowered tolerance in subjects exhibiting high orthostatic indexes on the active orthostatic test. Results demonstrate the diagnostic value of the simple active orthostatic test for applications in aeromedical examinations. A.L.W.

**A82-30029** † The organization of blood transfusions and blood substitutes on board ships at sea (Organizatsiia perelivaniia krovi i krovezamenitelei na korabliakh v more). V. D. Shevchenko and G. N. Zavgorodnii. *Voenno-Meditsinskii Zhurnal*, Feb. 1982, p. 46, 47. In Russian.

**A82-30030** † The value of spiroergography in the diagnosis of the initial stage of cardiac insufficiency (Znachenie spiroergografii v diagnostike nachal'noi stadii serdechnoi nedostatochnosti). V. I. Kolenok and K. I. Korytnikov. *Voenno-Meditsinskii Zhurnal*, Feb. 1982, p. 56-58. In Russian.

Spiroergography is evaluated as a possible noninvasive means for the detection of the initial stage of cardiac insufficiency during exercise in patients with ischemic heart disease. Measurements of oxygen consumption were compared with electrocardiography obtained during graded submaximal bicycle ergometer exercise in patients with ischemic heart disease and healthy controls. Results of

spiroergography allowed the division of the patients into two groups: those exhibiting no signs of cardiac insufficiency during exercise and those in its initial stages. The first group is observed to exhibit a greater exercise tolerance, amount of work performed, exercise oxygen consumption, level of aerobic reserves, oxygen consumption per kg body weight, and oxygen consumption per heartbeat and less oxygen consumption per unit work performed than the second group, although values of these parameters were significantly exceeded by the controls. Results thus demonstrate the capacity of spiroergometry to distinguish between cardiac compensation and the initial stages of cardiac insufficiency in patients with ischemic heart disease. A.L.W.

**A82-30031 †** Perforated gastric and duodenal ulcers in servicemen (Probodnye iazvy zheludka i dvenadtsatiperstnoi kishki u voennosluzhashchikh). G. N. Tsybuliak and V. N. Satsukevich. *Voenno-Meditsinskii Zhurnal*, Feb. 1982, p. 62-64. In Russian.

**A82-30032 †** Study of the simultaneous effects of hormones and radioprotectors in the exposure of animals to ionizing radiation (Issledovanie sovmeistnogo deistviia gormonov i radioprotektorov pri ioniziruiushchem obluchenii zhivotnykh). D. Benke, K. Bodo-Sekeikhidine, and A. Shanta. *Voenno-Meditsinskii Zhurnal*, Feb. 1982, p. 65-68. 14 refs. In Russian.

The effects of anabolic and related hormones, which act to suppress the inhibition of protein synthesis induced by ionizing radiation, in combination with radioprotective compounds on the survival of animals exposed to ionizing radiation are investigated. Survival rates were evaluated in mice exposed to 630 and 800 R (minimum lethal and absolute lethal doses) of X rays, or a dose of 750 R of gamma rays (the LD50) with preliminary or concurrent administration of the radioprotectors AET (S2-beta-aminoethylisothiuroniumbromide hydrobromide) and ixepirine (sodium bis-alpha-propionylglycyl disulfide) and the anabolic hormones nerobolyl (norandrostenolone phenylpropionate) and petaboly (norandrostenolone decanoate) and the hormone retandrol (testosterone phenylpropionate). Whereas the single injection of an anabolic combined with a radioprotector is not seen to increase survival rates, their combined use is effective when the radioprotector is administered before radiation and anabolics are continued following irradiation. The best results are obtained with the hormone nerobolyl. A.L.W.

**A82-30033 †** The survival of dogs irradiated with lethal doses of gamma radiation under conditions of chemical radioprotection and subsequent therapy (Vyzhivaemost' letal'no gamma-obluchennykh sobak v usloviakh khimicheskoi radiozashchity i posleduiushchei terapii). P. Kuna, M. Dostal, and P. Petyrek. *Voenno-Meditsinskii Zhurnal*, Feb. 1982, p. 68, 69. 6 refs. In Russian.

The effectiveness of the intramuscular introduction of radioprotective substances and therapeutic substances in the increase of survival under exposure to ionizing radiation is investigated in dogs. Animals were exposed to a dose of 300 rad 15-20 min after the intramuscular injection of cystamine or a combination of cystamine with mexamine, and treated with vitamins, antibiotics and ferriolylglukine for 28 days following exposure. In experiments conducted in the summer, the use of radioprotective substances with therapy is not found to increase survival significantly with respect to the use of therapy alone. Therapy without radioprotectors is, however, ineffective in increasing survival under winter conditions, at temperatures of -6 C. In these conditions, only the combination of radioprotectors with therapy increased the number of surviving animals. A.L.W.

**A82-30296 \*** The effect of abnormal cell proportion on specimen classifier performance. K. R. Castleman and B. S. White (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA). *Cytometry*, vol. 2, no. 4, 1981, p. 155-158. NIH-supported research; Contract No. NAS7-100.

An analysis is presented of the results obtained from a cell classifier which is confronted with an abnormal/normal cell ratio which is different from the ratio assumed in the calibration of the classifier. False negative and false positive error rates are determined in advance for classifier operation, along with the necessary sample size in order to validate the predicted distributions. Changes are

demonstrated to happen only regarding the false negative rate, where reductions in the abnormal cell rate below the expected rates would cause totally unreliable data. Substantial overproduction of abnormal cells would be quickly noticeable, while production rates beyond, but close to, the expected rates would only require more extensive sampling. Classifier systems for 10% proportions of abnormal cells are concluded to be possible, but difficulties are present with much lower rates. M.S.K.

**A82-30298 †** For a prolonged stay in space (Dlia dologo prebyvaniia v kosmose). I. Iudin (Federatsiia Kosmonavtiki SSSR, USSR). *Nauka i Tekhnika*, Jan. 1982, p. 6, 7. In Russian.

The techniques tested on Salyut-6 to counter the adverse effects of prolonged weightlessness on physiological functions are described. These techniques include the use of specially designed space suits, the use of treadmills and bicycle ergometers, and electrical stimulation of the muscles. B.J.

**A82-30301 †** Evidence for a biological clock. V. Kiuchariants. *Soviet Life*, Jan. 1982, p. 58.

Mechanisms which influence the biologic rhythms of human cells and the possibility of controlling the alterations are discussed. Cells are known to delay splitting while repairs to DNA strands are occurring, and illness can be felt on a whole-person level when disruptions of internal rhythms have been induced by noise, changed daily schedules, and with the ingestion of narcotics. Increased cell fission rates increase the rate of onset of cell death. Some indications are present that the regulatory mechanism resides in the hypothalamus, although the resistance of the body to disease is asserted to reside in the integrity of cellular membranes. The membranes limit the distance that DNA strands may drift apart when damaged, thus increasing the opportunities for self-repair. M.S.K.

**A82-30302 †** Thermal shock and gene operation (Teplovoi shok i rabota genov). M. B. Evgen'ev. *Khimiia i Zhizn'*, June 1981, p. 14-19. In Russian.

Molecular processes occurring in the cell which serve to protect an organism from overheating are discussed. The discovery of puffs in the salivary gland giant chromosomes of drosophila which become apparent upon animal exposure to high temperatures is considered, and the isolation of the seven so-called thermal shock proteins corresponding to the nine sites of RNA synthesis signalled by the giant chromosome puffs is outlined. The question of the regulation of the genes expressing the thermal shock proteins is considered, and evidence for a gene responsible for the turning on and normal operation of the thermal shock system, possibly by some mechanism involving the mitochondria, is presented. Questions of the mechanism of action of the thermal shock proteins, which have been observed to bind to sites of former puffs on the chromosome and of the evolution and existence of such thermal protection mechanisms in different species are then considered. A.L.W.

**A82-30303 †** Under the hot sun (Pod solntsem goriachim). F. F. Sultanov (Akademiiia Nauk Turkmenskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Aridnoi Zony, Turkmen SSR). *Khimiia i Zhizn'*, June 1981, p. 9-13. In Russian.

A discussion is presented on experience gained at the Institute of Physiology and Experimental Pathology of the Academy of Sciences of the Turkmenian SSR on the effects of heat and techniques of adaptation to conditions of desert heat. Particular consideration is given to a bicycle-ergometer simulator for adaptation to desert heat. B.J.

**A82-30766** The role of protein phosphorylation in neutral and hormonal control of cellular activity. P. Cohen (Dundee, University, Dundee, Scotland). *Nature*, vol. 296, Apr. 15, 1982, p. 613-620. 160 refs. Research supported by the Medical Research Council, British Diabetic Association, British Heart Foundation, and Cancer Research Campaign.

Current knowledge of the control of glycogen metabolism is reviewed, and the increasing body of evidence is presented that implicates many of the proteins involved in the control of glycogen metabolism in the regulation of other cellular activities. Neural control via calcium ions, hormonal control of glycogen metabolism by multi-site phosphorylation, and protein phosphatases involved in glycogen metabolism in skeletal muscle are discussed. The role of



cyclic AMP-dependent protein kinase and of calmodulin in regulating enzyme activity are detailed. Various protein phosphatases involved in different cell functions are discussed. C.D.

**A82-30870** Perception of suprathreshold stimuli during saccadic eye movement. L. A. Riggs, R. K. Moore, A. G. Ellicott (Brown University, Providence, RI), and F. C. Volkman (Smith College, Northampton, MA). *Vision Research*, vol. 22, no. 4, 1982, p. 423-428. 44 refs. Grant No. NIH-R01-EY-03169.

**A82-30871** Evidence for transient luminance and quasi-sustained color mechanisms. S. H. Schwartz and M. S. Loop (Alabama, University, Birmingham, AL). *Vision Research*, vol. 22, no. 4, 1982, p. 445-447. 14 refs. Grants No. NIH-R01-EY-03303; No. NIH-T32-EY-07703-3; No. NIH-P30-EY-03039.

Experimental results from an examination of perceptual temporal characteristics of luminance and color detection are reported. Light from a 12 V bulb was focused on the subject's pupil with the luminance being varied and measured by a photometer. The subjects pressed a telegraph key when any stimulus was perceived. Filters controlled the level of luminance and the color, and white noise was continuously supplied through earphones to mask shutter noise. Flashes at 620 and 460 nm elicited responses corresponding to color perception and generated histograms which were different from a pure luminance change. It was concluded that luminance threshold is governed by a transient visual mechanism while color perception is governed by a slower, quasi-sustained visual mechanism. Increasing the background intensity tended to create a situation where either color or luminance were equal detection stimuli in terms of quickness of response. M.S.K.

**A82-30872** Contour curvature analysis - Hyperacuties in the discrimination of detailed shape. R. J. Watt and D. P. Andrews (Keele, University, Keele, Staffs., England). *Vision Research*, vol. 22, no. 4, 1982, p. 449-460. 18 refs.

Curvature discrimination thresholds were measured for a wide range of stimulus curvatures and sizes. Results are compared with an ideal processor of curvature to provide relative efficiencies. The results lead to three major findings. (1) Curved lines may be processed with the same precision as straight lines for decisions of shape, demonstrating a new class of hyperacuity. (2) High relative efficiencies are obtained for all curved lines with an orientation range of less than 40 deg. (3) This performance is not however consistent with common processing for straight and curved lines. The results are discussed, and two or possibly three separate processes are suggested as the basis for detailed shape perception. (Author)

**A82-30873** The effect of convergence on the vestibulo-ocular reflex and implications for perceived movement. R. B. Post and H. W. Leibowitz (Pennsylvania State University, University Park, PA). *Vision Research*, vol. 22, no. 4, 1982, p. 461-465. 17 refs. Grants No. NIH-MH-08061; No. NIH-EY-03276.

The apparent motion of a fixated stimulus during head translation in the dark was found to depend on the magnitude of the vestibulo-ocular reflex (VOR). Absolute convergence level determines VOR magnitude and thereby influences apparent motion during head movement by determining the magnitude and direction of the pursuit effort required to maintain gaze stability. The results are discussed in terms of the biological utility of the coupling between convergence and the VOR in maintaining image stability, and the role of the pursuit eye movement system in illusory movement. (Author)

**A82-30874** Contrast sensitivity at high velocities. D. C. Burr (CNR, Istituto di Neurofisiologia, Pisa, Italy) and J. Ross. *Vision Research*, vol. 22, no. 4, 1982, p. 479-484. 33 refs.

Measurements were made of the contrast required to see the direction of motion of drifting gratings and of moving bars. The spatial frequency at which least contrast is required to see sinusoidal gratings decreases as their velocity increases, but peak sensitivity is identical at all velocities up to 800 deg/sec. Similarly, the wider a single bar, the higher the velocity at which it is best visible. A bar 80 deg wide is best seen when moving at 300-500 deg/sec, and can be seen, and its direction of motion identified, even when moving at 10,000 deg/sec. These results show that motion does not diminish

the visual passband, but instead slides the spatial frequency window along the spatial frequency scale, maintaining peak sensitivity at a temporal frequency of about 10 Hz (at photopic luminances).

(Author)

**A82-30875** A contribution to the history of Russian and Soviet aviation psychology: Documents and materials (K istorii otechestvennoi aviatsionnoi psikhologii: Dokumenty i materialy). Edited by K. K. Platonov. Moscow, Izdatel'stvo Nauka, 1981. 320 p. In Russian.

This work is an annotated collection of archival documents and memoirs relating to the history of Russian and Soviet aviation psychology. The material covered ranges from the first scientific balloon flight in Russia in 1804 to the development of Soviet aviation psychology from 1917 to 1940. B.J.

**A82-30952 #** Biological effects of high-frequency radiation - The concept of the specific absorption rate /SAR/ and its effect on safety regulations (Biologische Effekte der Hochfrequenzstrahlung - Das Konzept der Spezifischen Absorptionsrate SAR und seine Auswirkungen auf Schutzvorschriften). K. W. Hofmann (Forschungsgesellschaft für angewandte Naturwissenschaften, Forschungsinstitut für Hochfrequenzphysik, Wachtberg-Werthhoven, West Germany). (International Union of Radio Science and Nachrichtentechnische Gesellschaft, Gemeinsame Tagung, Kleinheubach, West Germany, Oct. 5-9, 1981.) *Kleinheubacher Berichte*, vol. 25, 1982, p. 3-17. 63 refs. In German.

The development of protection guidelines based on the biological effects of electromagnetic radiation in the radio frequency range is reviewed, and the concept of equating exposures in terms of a specific absorption rate (SAR) is presented. To define SAR in respect to orientation in the field over a relatively wide frequency range, models representing the absorbing body are used in addition to various techniques in theoretical dosimetry. The dosimetric results are presented in terms of the SAR to provide a basis for new developments in radio frequency radiation protection guidelines in the USA and the Federal Republic of Germany. D.L.G.

**A82-31151 †** Circadian rhythm dynamics under conditions of an altered gaseous medium and hypokinesia (Dinamika tsirkadnykh ritmov v usloviakh izmenennoi gazovoi sredy i gipokinezii). N. A. Agadzhanian and V. N. Cherniakova. *Fiziologiya Cheloveka*, vol. 8, Mar.-Apr. 1982, p. 179-191. 68 refs. In Russian.

Characteristics of the daily oscillations in human physiological functions during restricted motor activity are investigated along with the possibility of correcting circadian rhythm impairments by the use of hypoxic breathing gas compositions, graded exercise and combinations thereof. Measurements of heart rate, body temperature, saliva sodium content, diuresis and urinary sodium and potassium excretion were made in 20 healthy subjects during 49 days of antiorthostatic hypokinesia and 30 days of bed rest in a pressure chamber. Prolonged hypokinesia is found to provoke various types of disturbances in human circadian rhythms, most notably a desynchronization of the rhythms studied and decreases in their amplitude. Moderate hypoxia at daily intervals stabilizes cardiac activity and body temperature rhythms, however marked effects are found when hypoxia is combined with graded exercise. A.L.W.

**A82-31152 †** Effects of geomagnetic field disturbances on the diurnal rhythm of physiological functions (Vliianie vozmushchenii geomagnitnogo polia na sutochnuiu ritmiku fiziologicheskikh funktsii). G. V. Ryzhikov, V. A. Kuz'menko, and A. B. Buluev (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologiya Cheloveka*, vol. 8, Mar.-Apr. 1982, p. 192-198. 20 refs. In Russian.

Differences in the diurnal physiological rhythms of healthy humans during times of weak and strong geomagnetic field disturbances are studied in light of observations of changes in physiological rhythms accompanying degradations in physiological condition and increased morbidity during geomagnetic disturbances. Body temperature, arterial pressure, heart rate and respiratory rate were measured six times daily in 30 healthy subjects at rest, and analyzed with respect to values of the mean K index for the corresponding days. Decreases in the range of diurnal adjustments of body temperature and heart rate and an advance of the transition from the positive to the negative phase of the diurnal rhythms are observed during

periods of enhanced geomagnetic disturbances as indicated by K indexes between 3.7 and 5.3. Systolic pressures on the other hand exhibit the opposite tendencies on disturbed days. These unlike changes in the rhythms of different parameters thus lead to an increase in the mismatch of adaptive changes. A.L.W.

**A82-31153 †** The relation between cardiac and respiratory rhythms as a function of the state of the geomagnetic field (Sootnoshenie mezhdu ritmami serdtsebeniia i dykhanii v zavisimosti ot sostoianii geomagnitnogo polia). V. A. Kuz'menko, V. A. Gumeniuk, O. S. Raevskaia, and I. M. Syrkina (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologiya Cheloveka*, vol. 8, Mar.-Apr. 1982, p. 199-202. 11 refs. In Russian.

The characteristics of cardiac and respiratory rhythms and their interrelationship in the same individual are compared for periods of high and low geomagnetic disturbedness. EKGs and pneumograms were measured two to three times a day in four healthy subjects over the course of 20 to 26 days, and compared with the level of geomagnetic disturbances as indicated by the three-hour K index for the corresponding days. Functional reorganizations are observed during days of elevated geomagnetic disturbances, which are associated with increases in respiratory rate, a suppression of respiratory arrhythmias and, most often, a suppression of cardio-respiratory synchronism. A.L.W.

**A82-31154 †** The ventilation-perfusion relation in residents of the Arctic coast of the north-east USSR (Ventiliatsionno-perfuzionnye sootnosheniia v legkikh u zhitel' Arkhticheskogo poberezh'ia Severo-Vostoka SSSR). A. P. Milovanov, M. T. Lutsenko, B. V. Noreiko, and G. I. Miroshnichenko (Akademiia Meditsinskikh Nauk SSSR, Moscow; Blagoveshchenskii Meditsinskii Institut, Blagoveshchensk, USSR). *Fiziologiya Cheloveka*, vol. 8, Mar.-Apr. 1982, p. 203-211. 10 refs. In Russian.

**A82-31155 †** Evaluation of human operator reliability according to physiological data (Otsenka nadezhnosti cheloveka-operatora po dannym fiziologicheskikh issledovani). V. V. Gorbunov, V. V. Dosychev, and N. V. Makarenko. *Fiziologiya Cheloveka*, vol. 8, Mar.-Apr. 1982, p. 217-222. 20 refs. In Russian.

Experiments were conducted to develop physiological criteria for human operator reliability as characterized by the probability of the correct processing of increasing amounts of visual information. Measurements of electroencephalographic beta, alpha, theta and delta waves, electromyograms of the left hand, heart rates and respiratory rates were obtained in subjects performing a trinary selection task when presented with visual signals at rates of from 30 to 160/min, and used to compute a degree of difficulty expressing the physiological cost of performing the task at various rates. The degree of difficulty computed according to the values of biological, emotional and purposeful activity indicators is found to exhibit a close linear relation with operator processing capacity at all information rates. Limiting value of the degree of difficulty for the efficient processing of quantities of visual information are obtained, and it is concluded that this factor may be used for the evaluation of operator reliability. A.L.W.

**A82-31156 †** Method for improving the reliability of the recognition and classification of worker physiological condition in problems of work physiology (Metod povysheniia nadezhnosti razpoznavaniia i klassifikatsiia funktsional'nykh sostoianii organizma rabotnika v zadachakh fiziologii truda). I. A. Merkur'ev and E. G. Tyshlek (Ministerstvo Zdravookhraneniia Ukrainskoi SSR, Nauchno-Issledovatel'skii Institut Gigieny Truda i Profzabolevanii, Donetsk, Ukrainian SSR). *Fiziologiya Cheloveka*, vol. 8, Mar.-Apr. 1982, p. 223-227. 9 refs. In Russian.

**A82-31157 †** Effects of novodrine and physical exercise on hemodynamics and coronary blood supply in the healthy human (Vlianie novodrina i fizicheskoi nagruzki na gemodinamiku i krovosnabzhenie serdtsa zdorovogo cheloveka). V. V. Chestukhin, V. E. Katkov, R. I. Lapteva, N. I. Kauricheva, A. A. Petrov, I. Iu. Mart'ianova, O. Kh. Zybin, and V. N. Nesvetov (Ministerstvo Zdravookhraneniia SSSR, Institut Transplantologii i Iskusstvennykh Organov, Moscow, USSR). *Fiziologiya Cheloveka*, vol. 8, Mar.-Apr. 1982, p. 241-246. 22 refs. In Russian.

The hemodynamic and metabolic responses of the normal heart to physical exercise and the injection of the catecholamine novodrine are determined to serve as a standard for the evaluation of cardiac patients. Catheterization of the left ventricle and coronary sinus were performed in five healthy male volunteers to allow blood sampling. Ergometer exercise and the administration of novodrine are found to produce equal changes in heart rate, cardiac cycle phase duration and contractility, although novodrine reduced cardiac preload while leaving afterload unchanged and exercise had the opposite effect. The product of heart rate with arterial pressure, an indirect indicator of myocardial oxygen demand, increased significantly with novodrine and more markedly after exercise; these changes were reflected in direct indicators of coronary blood supply. Measurements of coronary blood composition indicate the absence of myocardial ischemia. Myocardial elasticity is also noted to increase during increases in coronary blood supply. A.L.W.

**A82-31158 †** Relation of changes in autonomic reactions to the effectiveness of mental activity under conditions of emotional stress (Sviaz' izmenenii vegetativnykh reaktsii s effektivnost'iu umstvennoi deiatel'nosti v usloviakh emotsional'nogo napriazheniia). E. V. Belova and G. B. Golovanova (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR). *Fiziologiya Cheloveka*, vol. 8, Mar.-Apr. 1982, p. 247-252. 11 refs. In Russian.

**A82-31159 †** Effects of starvation on human tolerance to acute hypoxia (Vlianie golodaniia na perenosimost' chelovekom ostroi gipoksii). A. Iu. Katkov. *Fiziologiya Cheloveka*, vol. 8, Mar.-Apr. 1982, p. 253-257. 13 refs. In Russian.

The effects of various periods of alimentary starvation on human tolerances to extreme levels of acute hypoxia are investigated. Subjects were exposed to stepwise increasing and continuously increasing simulated altitudes of up to 10,000 m in a pressure chamber or to nitrogen breathing until the onset of impairments in mental functioning following fasts of 4 and 14 days duration. Four-day fasting is found to increase human tolerance levels to both stepwise and rapidly increasing hypoxia, without influencing the maximum duration of nitrogen breathing. The 14-day fast, on the other hand, sharply increased human tolerance to rapidly increasing hypoxia, particularly at rest, and more than doubled tolerance times for nitrogen breathing. The fundamental source of the antihypoxic effect of 4-day starvation is thus identified with a state of metabolic acidosis, while the antihypoxic effect of the 14-day fast is attributed to a reduction in oxygen demand and a slowing of deoxygenation as a result of a reduced ventilatory response to hypoxemia. A.L.W.

**A82-31160 †** Cardiac rhythm regulation at rest and during orthostasis (O regulatsii serdechnogo ritma v pokoe i pri ortostaze). V. R. Veber and Iu. G. Gaevskii (Semipalatinskii Meditsinskii Institut, Semipalatinsk, Kazakh SSR). *Fiziologiya Cheloveka*, vol. 8, Mar.-Apr. 1982, p. 258-261. 10 refs. In Russian.

A differential study is presented of the mechanisms of autonomic regulation providing for the stability of the cardiac rhythm at rest, the transition to orthostasis, and the secondary stabilization of the rhythm in orthostasis. Orthostatic intervalograms were derived from electrocardiographic R-R intervals measured in normal subjects including those who had received the autonomic nervous system blockers obzidane or atropine. The blockade of sympathetic inputs by obzidane is found to induce a shift in the resting pulse curve to the right on the pulsogram and an increase in pulse variability. An increase in sympathetic inputs provided by atropine shifts the curve to the left and decreases variability, as does the orthostatic test. The autonomic system blockers are also found to produce opposite effects on the pattern of heart rhythm variations during the transition from rest to orthostatic stability. Results demonstrate the roles of the sympathetic and parasympathetic nervous systems in the control of heart rhythms, and indicate the presence of different mechanisms controlling heart rate and its stability. A.L.W.

**A82-31161 †** The voluntary regulation of heart rate (K voprosu o proizvol'noi regulatsii chastyoty serdechnykh sokrashchenii). N. K. Stepanov, A. M. Zingerman, D. N. Menitskii, and K. F. Peskovskii (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Fiziologiya Cheloveka*, vol. 8, Mar.-Apr. 1982, p. 262-269. 35 refs. In Russian.

The possibility of and probable mechanisms for the voluntary

control of heart rate are investigated. Subjects seated in a semi-darkened room were asked to control the position of a beam on an oscillograph screen representing the cardiointervalogram of the subject recorded by an electrocardiograph. Results demonstrate the possibility of the voluntary stabilization, reduction and increase of heart rate, with increases more successfully produced than reductions. Analysis of pneumogram, electromyogram, and EEG data and blood pressure measurements indicates the reduction in heart rate to be accomplished by a general systemic weakening, and it is proposed that giving instructions as to this effect will lead to a more marked heart rate reduction. The voluntary quickening of heart rate appears to be a component of the nonspecific activation mechanism, which is evidently a part of the respiratory-cardiac reflex. It is also noted that functional destabilization of regulatory systems is a necessary condition for the directed self-regulation of heart rate. A.L.W.

**A82-31162 †** An approach to the determination of the reflex reactions of cardiac rhythm (Ob odnom podkhode k opredeleniiu reflektornykh reaktsii serdechnogo ritma). E. I. Shul'man, M. Iu. Gel'tsel', and M. B. Shtark (Akademiia Meditsinskikh Nauk SSSR; Akademiia Nauk SSSR, Institut Avtomatiki i Elektrometrii, Novosibirsk, USSR). *Fiziologiya Cheloveka*, vol. 8, Mar.-Apr. 1982, p. 270-274. 8 refs. In Russian.

A methodological approach is proposed for the determination of the reflex reaction of the cardiac rhythm to short-duration stimuli. The approach is based on the fact that changes in the R-R interval are synchronous with respiratory phases, so that at rest the difference between two adjacent R-R intervals in a given respiratory phase is relatively stable in a given individual and condition. This proposal has been verified by a study of the distribution characteristics of differences in adjacent R-R intervals during inspiration, pause and expiration over the course of 20-40 min, in which the histograms of the distribution were found to show little scatter or displacement from zero. A.L.W.

**A82-31163 †** Evaluation of object size upon viewing through an aperture (Otsenka razmera ob'ekta pri rassmatrivanii cherez apertury). V. D. Glezer, N. B. Kostelianets, and Iu. I. Levkovich (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologiya Cheloveka*, vol. 8, Mar.-Apr. 1982, p. 309-314. 11 refs. In Russian.

Factors influencing the illusory diminution of object size when the object is viewed with a limited portion of the retina or through a slit are investigated. Experiments involved the sequential presentation of portions of an equilateral triangle through moving circular apertures of various sizes to a group of 10 observers, who were asked to judge the size of the triangle based only on their views of portions through the aperture. Object size is found to be consistently underestimated when the object was viewed through the moving aperture. Comparison of data obtained in the presence and absence of the aperture indicates that the image size underestimation was due to two factors: the short viewing time for each image segment and the size of the aperture. Data thus support the existence of two mechanisms of size estimation, localized in the exterior geniculate body and the visual cortex. A.L.W.

**A82-31164 †** Color fusion under conditions of equal brightness (Sliianie tsvetov v usloviakh ravenstva po iarkosti). A. V. Bertulis, Iu. M. Bertulene, and R. I. Tsitvaras (Kaunasskii Meditsinskii Institut, Kaunas, Lithuanian SSR). *Fiziologiya Cheloveka*, vol. 8, Mar.-Apr. 1982, p. 315-319. 7 refs. In Russian.

The resolving power of the human eye under conditions where the color regions to be distinguished are of equal brightness is studied. Experiments involved color fields and rectangular grids consisting of bands of various monochromatic colors, with subjects asked to observe the sharpness of color boundaries as the colors change in relative brightness in the first case, and to compare the brightnesses of different colors in overlapping grids in the second. The boundary between different colors is observed to be less well perceived when the colors are of equal subjective brightness than in the case of a color gradient. Color bands of a spatial frequency greater than 10-13/deg are not distinguished if they are of equal subjective brightness. A decrease in the wavelength difference of the two colors decreases the critical frequency for color fusion, at which the two original colors are blended and a new color is perceived. The fusion effect may be used to measure spectral sensitivity. A.L.W.

**A82-31165 †** Characteristics of iron and copper metabolism during athletic training (Osobennosti obmena zheleza i medi pri sportivnoi trenirovke). V. Ia. Rusin, V. V. Nasolodin, and V. A. Vorob'ev (Iaroslavskii Gosudarstvennyi Universitet, Yaroslavl, USSR). *Fiziologiya Cheloveka*, vol. 8, Mar.-Apr. 1982, p. 326-332. 18 refs. In Russian.

The effects of athletic training on iron and copper metabolism in men and women are investigated. Determinations of blood iron and copper levels and iron and copper balances were made at various times of the year in untrained controls and in highly trained male and female skiers. Iron content in the formed elements of the blood is observed to vary with time of year in male athletes, being greatest in the fall-winter period, and in female athletes and untrained women, where it is greatest in the summer and fall. Changes in copper levels are less marked. The concentrations of iron and copper in the blood cells of all men were higher than in women, with the greatest difference between trained groups occurring during the period of intensive training. Shifts in blood trace element levels after competition are also observed to be greater in women than in men, while women absorbed more nutritive iron following competition. Results justify the use of dietary trace element supplements in athletes, particularly females, during all phases of training. A.L.W.

**A82-31388** A selective attention test as a predictor of success in flight training. D. Gopher (Technion - Israel Institute of Technology, Haifa, Israel). *Human Factors*, vol. 24, Apr. 1982, p. 173-183. 9 refs.

In the pilot selection test battery of the Israeli Air Force was studied using a group of 2000 flight cadets. In this test, subjects are presented with 48 auditory messages. Each message is composed of strings of words and digit names. Different strings are simultaneously presented to the two ears. Subjects are required to detect digit names in the relevant channel and to reconsider channel relevance upon indication. Three types of selective listening errors are recorded: omissions, intrusions, and switching errors. Flight cadets who had completed a two-year training program had significantly lower error scores on all attention measures. In addition, these measures had low correlations with all other tests of the pilot selection battery. Thus, attention capabilities appear to be an independent dimension that enhances the predictive validity of the present test battery. (Author)

**A82-31389** Performance effects of noise intensity, psychological set, and task type and complexity. V. J. Gawron (Calspan Advanced Technology Center, Buffalo, NY). *Human Factors*, vol. 24, Apr. 1982, p. 225-243. 70 refs. NSF Grant No. DAR-78-12722.

Knowledge of the effect of noise on performance is limited and is generally inconclusive. Examination of previous research indicated the need for a systematic and concurrent investigation of the effects of psychological set, type of task, task complexity (single or dual task), and noise intensity. Three states of psychological set were established by telling groups of eight subjects each that noise degrades, facilitates, or has no effect on performance. A control group was told nothing about noise effects. Three intensities of broad-band white noise (55, 70, 85 dBA) were presented over loudspeakers to each subject during the completion of a four-task, adaptive-criterion battery. The only significant main effect of noise was a facilitation of tracking performance. There were several significant interactions of noise with the other independent variables. (Author)

**A82-31412** Adaptation in motion perception - Alteration of motion evoked by ocular pursuit. J. Bacon (Tufts University, Medford, MA) and H. Wallach (Swarthmore College, Swarthmore, PA). *Perception and Psychophysics*, vol. 31, no. 3, Mar. 1982, p. 251-255. NSF Grant No. BNS-79-24462.

A new perceptual adaptation, an alteration in the perceived direction of motion given by ocular pursuit, is reported. When an object starts to move on a straight path, its displacement is initially given by a shift of its image on the retinas of the stationary eyes; then, after about 200 msec, the eyes start to track the moving object. The perception of motion that results from ocular pursuit was altered by causing ocular pursuit of a moving object to be preceded regularly by a displacement of the object's image whose direction differed from the direction of the pursuit movement. This was arranged by changing the direction of the given motion at approxi-

mately the moment when image displacement changed into tracking. Prolonged exposure to such conditions resulted in a change of the tracked motion's apparent direction, which became somewhat more like the direction of the preceding motion phase that was given by image displacement. (Author)

**A82-31447** Visual depth sensitivities of various cues for depth perception. S. Nagata (Japan Broadcasting Corp., Broadcasting Science Research Laboratories, Tokyo, Japan). *NHK Laboratories Note*, Oct. 1981. 10 p. 13 refs.

A common scale for evaluating the availability of the depth cue in visual perception is proposed. The depth sensitivity (DS) is a ratio scale expressed as the viewing distance/the detection threshold of depth distance. The DS is intended as an empirical grounds for comparing the relative effectiveness of cues, e.g., motion parallax, retinal image size, accommodation, and brightness, for discerning relative depth. It is assumed that valid changes in depth perception retain visual characterization of the object and that the just-noticeable difference corresponds to the depth sensation on each cue for the visual distance. Two subjects were engaged in trials of depth perception of projected objects viewed through a slit or artificial pupil, covering all known depth cues in individual tests. Binocular parallax was most sensitive up to 10 m, while motion parallax was best at 8 deg/sec, with a sensitivity exceeding binocular parallax at 10 m. M.S.K.

**A82-31486** † Reflection of individual characteristics of human and animal higher nervous activity in the nature of heart rate changes (Otrazhenie individual'nykh osobennostei vysshei nervnoi deiatel'nosti cheloveka i zhivotnykh v kharaktere izmenenii chastoty serdechnykh sokrashchenii). N. V. Makarenko (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologicheskii Zhurnal* (Kiev), vol. 28, Mar.-Apr. 1982, p. 175-182. 14 refs. In Russian.

The relation between individual patterns of higher nervous activity and the characteristics of autonomic responses are studied by the measurement of heart rate in humans processing various amounts of visual information and in dogs during the establishment of conditioned reflexes. In dogs, changes in R-R interval duration and heart rate during the development and reinforcement of positively conditioned reflexes are found to be directly dependent on the intensity of the stimulation process in the individual animal. Humans with a high level of nervous system mobility exhibit a significantly greater pulse reactivity upon the solution of problems with a time limit than those who exhibit low mobility. Results may be used in the development of a method for the evaluation of the psychophysiological stress of a human operator in a man-machine system and in operator selection and training. A.L.W.

**A82-31487** † Age characteristics of fatigue during local muscular work in humans (Vozrastnye osobennosti utomleniia pri lokal'noi rabote myshts u cheloveka). T. V. Alferova (Cheliabinskii Institut Fizicheskoi Kul'tury, Chelyabinsk, USSR). *Fiziologicheskii Zhurnal* (Kiev), vol. 28, Mar.-Apr. 1982, p. 230-235. 14 refs. In Russian.

Functional changes in the cardiovascular and respiratory systems and the motor apparatus during local muscular work in persons of different ages are investigated. Electrocardiography, arterial pressure measurements, oxyhemography during a breath-holding test and electromyography were used to assess work capacity in persons of nine age groups from 4 to 95 years performing static and dynamic work on a digital ergograph to exhaustion, and in children doing school work. Variations with age in muscle power, mean load, work performed, fatigue and endurance indicate that work capacity in persons of different ages is determined by the unequal development of different motor capacities as well as differences in the regulation of fatigue processes. Blood supply to working muscles is maintained in young children by an increase in heart rate, in juveniles and adults by increases in blood pressure, while in the elderly circulation remains practically unchanged. Changes in fatigue patterns are observed in school children following lessons, which correspond to increased fatigueability, decreased endurance and a high volume of ergographic work performed. A.L.W.

**A82-31494** † Changes in psychophysiological functions of flight personnel under various regimes of active rest (Izmenenie

psikhofiziologicheskikh funktsii u lits letnogo sostava pri razlichnykh rezhimakh aktivnogo otdykh). N. I. Frolov, A. N. Kol'tsov, and S. V. Babanin. *Voenno-Meditsinskii Zhurnal*, Mar. 1982, p. 42-44. In Russian.

The effects of various intensities and regimes of exercise during rest at a sanatorium on the psychophysiological condition of flight personnel are investigated. Programs consisting of morning drills, training on special apparatus, rowing, swimming, tourism and sports were assigned to subjects grouped on the basis of initial physical condition and age, and performed at various intensities. The active rest regimes are found to be more beneficial than passive rest, leading to more rapid reductions in complaints of fatigue, irritability and exercise fatigue, improvements in subjective well-being, reductions in heart rate and arterial pressure, increases in stroke and minute blood volumes and breath holding time, improvements in cardiovascular adaptation to exercise, increases in visual discrimination, and static muscular endurance and reductions in reaction time and tremors. The degree of improvement is observed to depend on exercise intensity within each group, and to be greatest in overweight persons. A.L.W.

**A82-31495** † Some indicators of human adaptation to humid tropical conditions (O nekotorykh pokazateliakh adaptatsii cheloveka k usloviyam vlazhnykh tropikov). V. V. Berdyshev. *Voenno-Meditsinskii Zhurnal*, Mar. 1982, p. 45-47. 10 refs. In Russian.

**A82-31501** Discrete models of a human operator /Survey of foreign research/. I. E. Tsibulevskii. (*Avtomatika i Telemekhanika*, Sept. 1981, p. 111-132.) *Automation and Remote Control*, vol. 42, no. 9, Feb. 20, 1982, pt. 2, p. 1226-1241. 15 refs. Translation.

Discrete models of the human operator which include both a perception of the input signal and discrete control signals at the output are reviewed. The model of Bekey (1962) is shown to encompass a transfer function with a clamping element of zero order converted into an element of the first order, while the neuromuscular element is represented by an inertial unit with a gain and time constant. Wilde and Wescott (1963) developed a predicting model based on the assumptions that visual information is separated by discrete time intervals, impulses for movement from the brain are dispatched in equal periods of time, and the programs of motion are configured to have the motion begin at a particular time in the future. Further attention is given to the details of pursuit tracking model, for tracking with a preview, a model with finite states, and a model in which pulse corrections are introduced for the velocity value at the output. M.S.K.

**A82-31502** † Nutrition and athletics (Pitanie i sport). K. A. Korovnikov, K. A. Laricheva, and N. I. Ialovaia (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Teoriia i Praktika Fizicheskoi Kul'tury*, Mar. 1982, p. 18-20. 24 refs. In Russian.

The nutrients ingested by athletes not only must compensate for the energy expended, they must also regulate the body's metabolism so that the various functional systems operate as economically as possible. Recent dietary theories advocating fasting are discussed. Fasting is decried because it interrupts precisely coordinated metabolic processes, in particular, the metabolism of proteins, and leads to an accumulation of the toxic products of intermediate metabolic steps. It also disturbs the electrolytic balance and interferes with the enzyme system, cell membranes, and the metabolism of vitamins. Diets calling for only certain classes of foods at a given time are deprecated, and their adverse physiological effects are listed. The experimentally verified principles underlying the type of diet that an athlete should have are expounded. A brief physiological description of the way in which carbohydrates, proteins, fats, and certain branched-chain amino acids provide energy to the muscles is included. C.R.

**A82-31503** † A comparative characterization of hemodynamics and respiration under static and dynamic loads (Sravnitel'naia kharakteristika gemodinamiki i dykhanii pri staticheskikh i dinamicheskikh fizicheskikh nagruzkakh). A. B. Gandel'sman, T. A. Evdokimova, N. Kh. Sidorova, and A. P. Karpov (Gosudarstvennyi Institut Fizicheskoi Kul'tury; Leningradskii Meditsinskii Institut, Leningrad, USSR). *Teoriia i Praktika Fizicheskoi Kul'tury*, Mar.

1982, p. 24-26. 22 refs. In Russian.

It is pointed out that a combination of static and dynamic loads is at work when the muscles are used in motor activity. The individual contributions of these loads to the changes that occur in respiration and hemodynamics are investigated. A bicycle ergometer provides the dynamic load; the static load comes from pressing the handle of an electrogoniometer for 1 min. The average arterial pressure is found to increase more for static loads than for dynamic loads. The consumption of O<sub>2</sub>, here used to assess respiration, is greater with dynamic loads. It is concluded that, with static loads, vascular-reflector reactions predominate; with dynamic loads, the main reactions are respirative-energetic. C.R.

**A82-31504 †** The functional reserves of athletes (Problema funktsional'nykh rezervov sportsmen). A. S. Moszhukhin (Gosudarstvennyi Institut Fizicheskoi Kul'tury, Leningrad, USSR). *Teoriia i Praktika Fizicheskoi Kul'tury*, Mar. 1982, p. 49-51. In Russian.

The abilities that manifest themselves under extremely unusual or threatening circumstances are discussed. These reserves are classified here according to origin (biological and social) and type (functional and structural). It is pointed out that this first distinction is somewhat arbitrary since social reserves have a biological basis. Social reserves are in turn subdivided into psychical reserves, which are related to motivation, and reserves that depend upon a person's professional ability. In discussing functional reserves, a distinction is made between those that are biochemical and those that are physiological. In the case of athletes, it is pointed out that all the factors making up the reserves can be altered through training. A fuller knowledge of the way in which these reserves come into play could therefore be used to improve training programs. C.R.

**A82-31505 †** Changes in the peroxide metabolism of weightlifters and wrestlers under the conditions of systematic muscular activity (Izmenenie perekisnogo obmena u tiazheolatetov v usloviakh sistematicheskoi myshechnoi deiatel'nosti). V. E. Kal'nitskaia (Krasnodarskii Institut Fizicheskoi Kul'tury, Krasnodar, USSR). *Teoriia i Praktika Fizicheskoi Kul'tury*, Mar. 1982, p. 28-30. 8 refs. In Russian.

**A82-31506 †** The biological and therapeutic effect of microwaves (O biologicheskoi i lechennoi deistvii mikrovoln). A. N. Obrosova and O. A. Krylov (Tsentral'nyi Nauchno-Issledovatel'skii Institut Kurortologii i Fizioterapii, Moscow, USSR). *Voprosy Kurortologii i Fizioterapii i Lechebnoi Fizicheskoi Kul'tury*, Mar.-Apr. 1982, p. 1-8. In Russian.

The deep penetration of microwaves is regarded as a distinctive feature. But since the depth depends on a large number of factors, studies carried out on animals can not readily be used in assessing the effect on man. In medical experiments, the temperature change in the tissue or organ subjected to radiation is considered the most reliable indicator of intensity. Tissues that are unable to release heat are usually the ones damaged by microwaves. Microwaves also have the effect of lowering arterial pressure. Experiments on rats showing that microwaves inhibit myocardial infarction are described. Reference is also made to studies showing that microwaves counteract certain physiological irregularities associated with hypertension. C.R.

**A82-31507 †** Decimetric waves in the combined therapy of patients with cerebral circulatory insufficiency (Volny detsimetrovogo diapazona v kompleksnom lechenii bol'nykh s nedostatochnost'iu mozgovogo krovoobrashcheniia). N. I. Strelkova (Tsentral'nyi Nauchno-Issledovatel'skii Institut Kurortologii i Fizioterapii, Moscow, USSR). *Voprosy Kurortologii i Fizioterapii i Lechebnoi Fizicheskoi Kul'tury*, Mar.-Apr. 1982, p. 28-31. 11 refs. In Russian.

**A82-31508 †** The state of vegetative functions with hypertension under the action of decimetric waves on the region of the brain /Experimental study/ (Sostoianie vegetativnykh funktsii pri gipertenzii pod deistviem voln detsimetrovogo diapazona na oblast' golovnogo mozga /Eksperimental'noe issledovanie/). M. S. Golinskaia. *Voprosy Kurortologii i Fizioterapii i Lechebnoi Fizicheskoi Kul'tury*, Mar.-Apr. 1982, p. 25-28. 8 refs. In Russian.

The experiment is carried out on rats. With comparatively small intensities of decimetric waves, coordinated changes are observed between the hypotensive action, the frequency of heart contractions, the rhythm of respiration, and energy metabolism. With an intensity

up to 400 mW/sq cm, the progressive lowering of the maximum systolic pressure does not accord with hemodynamics indicators, the rhythm of respiration, and other vegetative reactions. C.R.

**A82-31509 †** The effect of decimeter waves and sinusoidal modulated currents on the nuclear DNA content of cerebral nerve cells /Experimental study/ (Deistvie voln detsimetrovogo diapazona i sinusoidal'nykh modulirovannykh tokov na sodержanie iadernoi DNK nervnykh kletok golovnogo mozga /Eksperimental'noe issledovanie/). L. V. Mikhailik (Tsentral'nyi Nauchno-Issledovatel'skii Institut Kurortologii i Fizioterapii, Moscow, USSR). *Voprosy Kurortologii i Fizioterapii i Lechebnoi Fizicheskoi Kul'tury*, Mar.-Apr. 1982, p. 22-25. 7 refs. In Russian.

**A82-31510 †** Effects of decimetric waves on the temperature of the brain and adjoining tissues /Experimental study/ (Vliianie detsimetrovnykh voln na temperaturu golovnogo mozga i prilozhashchikh tkanei /Eksperimental'noe issledovanie/). S. N. Malikova, V. L. Malyshev, V. N. Balakireva, and L. G. Gorban' (Tsentral'nyi Nauchno-Issledovatel'skii Institut Kurortologii i Fizioterapii, Moscow, USSR). *Voprosy Kurortologii i Fizioterapii i Lechebnoi Fizicheskoi Kul'tury*, Mar.-Apr. 1982, p. 18-22. In Russian.

Temperature changes in the brain and adjoining tissues of animals and phantoms exposed to decimetric radiation are determined as a measure of energy absorption. Experiments were performed on wood shavings moistened by a physiological solution, anesthetized rabbits and dogs and animal corpses exposed to 400, 1200 or 2000 mW/sq cm decimetric radiation localized on the temporo-parietal region for up to 30 min. Comparison of the spatial and temporal patterns of temperature increase in the phantoms and corpses on the one hand with those in live animals on the other reveals the effects of decimetric waves to depend not only on the intensity and duration of the irradiation, but on the nature and condition of the cerebral blood cooling system. A.L.W.

**A82-31511 †** Immunodepressive and immunostimulatory effects of decimetric waves on the primary immunological response (Immunodepressivnoe i immunostimuliruiushchee deistvie voln detsimetrovogo diapazona pri pervichnom immunologicheskom otvete). V. M. Bogoliubov, I. D. Frenkel', S. B. Pershin, Iu. T. Ponomarev, Z. A. Sokolova, S. M. Zubkova, S. N. Kuz'min, A. I. Galenchik, and N. N. Kozlova (Tsentral'nyi Nauchno-Issledovatel'skii Institut Kurortologii i Fizioterapii, Moskovskii Nauchno-Issledovatel'skii Institut Vaksinn i Syvorotok, Moscow, USSR). *Voprosy Kurortologii i Fizioterapii i Lechebnoi Fizicheskoi Kul'tury*, Mar.-Apr. 1982, p. 13-17. 10 refs. In Russian.

The effects of irradiation by decimetric waves at various localizations on processes of immunogenesis in the primary immunological response are investigated. Experiments involved rabbits exposed to 120 mW/sq cm of 460 MHz radiation for 6 min daily, then injected with thymus-dependent sheep erythrocyte antigen. The effects of decimetric wave irradiation on the immune response are found to depend not only on the site of irradiation, but on the stage of the process at which the radiation is received. Irradiation of the projection zone of the thyroid gland during the production and induction phases of immunogenesis induces an immunodepression, while during the period preceding immunization it stimulates the immune response. In contrast, radiation of the projection zone of the adrenals at any period before or after antigen injection leads to the development of an immunodepressive effect by the stimulation of glucocorticoid functions. A.L.W.

**A82-31512 †** The effect of decimeter waves on the functional state of the cardiovascular system, and some biochemical and immunological indices of patients with myocardial infarction in the recovery phase (Vliianie voln detsimetrovogo diapazona na funktsional'noe sostoianie serdechno-sosudistoi sistemy, nekotorye biokhimicheskie i immunologicheskie pokazateli bol'nykh infarktami miokarda v faze vyzdorovleniia). E. I. Sorokina, N. B. Poshkus, Iu. Iu. Tupitsina, L. P. Volkova, A. V. Shubina, and V. E. Krasnikov (Tsentral'nyi Nauchno-Issledovatel'skii Institut Kurortologii i Fizioterapii, Moscow, USSR). *Voprosy Kurortologii i Fizioterapii i Lechebnoi Fizicheskoi Kul'tury*, Mar.-Apr. 1982, p. 9-13. 9 refs. In Russian.

**A82-31513 †** Changes of cardiac activity and regional cerebral circulation under gravitational effects simulated by anti-



orthostasis (Izmeneniia serdechnoi deiatel'nosti i regionarnogo krovoobrashcheniia golovy pri gravitatsionnykh vozdeistviakh, modelirovaniy). B. M. Fedorov and T. B. Sebekina. *Patologicheskaya Fiziologiya i Eksperimental'naya Terapiya*, Mar.-Apr. 1982, p. 3-10. 49 refs. In Russian.

The use of antiorthostasis as a model of gravitational effects is considered. The positioning of the trunks of anesthetized dogs in an antiorthostatic posture at angles of -45 and -90 deg to the horizontal plane causes a sharp increase of pressure in the fourth ventricle of the brain, a decelerated rhythm of cardiac contraction, increased peripheral resistance of branches of the carotid artery, and a sharp increase of the pressure in the jugular veins. Under antiorthostasis conditions, the increased resistance in the branches of the carotid artery and deceleration of the volumetric rate of circulation in them may be considered an emergency compensatory reaction preventing the overfilling of the cerebral vessels with blood. B.J.

**A82-31514 †** Specialized acidophilic products for the nourishment of athletes (Spetsializirovannyye atsidofil'nye produkty dlia pitaniia sportmenov). M. Ia. Brents, I. P. Slavgorodskaya, N. N. Kalinina, M. F. Verzhinskaya, O. I. Luchkina, A. P. Ekimovskii, S. N. Kulakova, Iu. P. Aleshko-Ozhevskii, and N. N. Makhova (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Voprosy Pitaniia*, Mar.-Apr. 1982, p. 18-21. In Russian.

**A82-31515 †** The energy requirements of railway-bridge assemblers (Potrebnost' v energii montazhnikov zheleznodorozhnykh mostov). E. M. Ratner, A. B. Kirpichnikov, M. N. Evlampieva, G. I. Bondarev, D. M. Demina, K. M. Kopirovskii, and N. P. Feoktistova (Ministerstvo Putei Soobshcheniia, Vsesoiuznyi Nauchno-Issledovatel'skii Institut Zheleznodorozhnoi Gigieny; Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Voprosy Pitaniia*, Mar.-Apr. 1982, p. 25, 26. In Russian.

**A82-31516 †** Ways to improve therapeutic and prophylactic assistance to water-transport workers (Puti sovershenstvovaniia lechebno-profilakticheskoi pomoshchi rabotnikam vodnogo transporta). Iu. L. Zabin (Ministerstvo Zdravookhraneniia RSFSR, Otdel Lechebno-Profilakticheskoi Pomoshchi Rabotnikam Vodnogo Transporta, Moscow, USSR). *Sovetskoe Zdravookhranenie*, no. 3, 1982, p. 23-28. In Russian.

**A82-31517 †** Competition between algae in a flow system (Konkurentsia mezdu vodorosliami v protochnoi sisteme). V. V. Alekseev (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) and T. G. Sazykina (Akademiia Nauk SSSR, Institut Atomnoi Energii, Moscow, USSR). *Zhurnal Obshchei Biologii*, vol. 43, Mar.-Apr. 1982, p. 205-211. 5 refs. In Russian.

**A82-31518 †** Hormonal mechanisms of seasonal rhythms in rats (Gormonal'nye mekhanizmy sezonnykh ritmov u krysi). V. V. Vinogradov (Akademiia Nauk Belorusskoi SSR, Otdel Regulatsii Obmena Veshchestv, Grodno, Belorussian SSR). *Zhurnal Obshchei Biologii*, vol. 43, Mar.-Apr. 1982, p. 197-204. 31 refs. In Russian.

Seasonal variations in blood corticosteroid levels and pentose phosphate pathway enzyme activities are studied in rats kept at a constant temperature of 20 C and 12-hr light cycle throughout the year. The activities of glucose-6-phosphate dehydrogenase and 6-phosphogluconate dehydrogenase in the liver, kidneys, brain and spleen are observed to peak in the summer and autumn and reach a minimum in the winter and spring months. Corticosterone production is found to rise from April to October, although peripheral dehydrogenase activation takes place from June-July through December-January. Results are explained by the dependence of enzyme activities on hormone levels and their relation to patterns of pancreatic insulin secretion, which is in turn closely related to the seasonal rhythmicity of the hypothalamic-adrenal system. It is further concluded that the temporal matching of the yearly cycle of hypothalamic-adrenal activity with the yearly environmental cycle takes place according to a stress mechanism. A.L.W.

**A82-31519 †** Clinical features of the effect of factory noise as a function of its type and spectral characteristics (Klinicheskie obobshchennosti deistviia proizvodstvennogo shuma v zavisimosti ot ego kharaktera i spektral'noi kharakteristiki). Zh. S. Kanevskaia, V. A. Koroleva, and E. L. Sineva (Institut Gigieny, Moscow, USSR).

*Gigiena Truda i Professional'nye Zabolevaniia*, Mar. 1982, p. 24-27. In Russian.

**A82-31520 †** The state of hearing in pilots in civil aviation (O sostoianii slukha u pilotov grazhdanskoi aviatsii). Iu. N. Kamenskii, V. M. Kozin, and O. V. Kozin (Institut Grazhdanskoi Aviatsii, Moscow, USSR). *Gigiena Truda i Professional'nye Zabolevaniia*, Mar. 1982, p. 51-53. 14 refs. In Russian.

**A82-31521 †** Individual sensitivity to noise (K voprosu ob individual'noi chuvstvitel'nosti k shumu). Iu. P. Syromiatnikov (Institut Gigieny, Moscow, USSR). *Gigiena Truda i Professional'nye Zabolevaniia*, Mar. 1982, p. 27-31. 7 refs. In Russian.

The paper examines individual variants of the growth rate of the constantly shifted auditory threshold (CSAT) and of the regress of the provisionally shifted auditory threshold (PSAT) in factory workers (weavers) exposed to noise at 101 dB. Irrespective of individual sensitivity to noise, saturation of the acoustic analyzer and stabilization of hypoacusis were revealed in weavers after 10-12 years of work in the 4000 Hz band. An algorithm is derived which makes it possible to predict values of hypoacusis after any length of work under conditions of industrial noise on the basis of the initial PSAT values and corresponding values of CSAT growth. B.J.

**A82-31522 †** Features of the temporal organization of the activated phase of sleep in frogs and turtles (Osobennosti vremennoi organizatsii aktivirovannoi fazy sna u liagushki i cherepakhi). S. G. Lazarev (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR). *Zhurnal Evoliutsionnoi Biokhimii i Fiziologii*, vol. 18, Mar.-Apr. 1982, p. 188-190. 8 refs. In Russian.

**A82-31523 †** The formation in human ontogeny of the ability to reproduce a given rhythm (O formirovani v ontogeneze cheloveka sposobnosti k vosproizvedeniiu zadannogo ritma). V. P. Morozov, K. A. Zaitseva, and N. V. Sukhanova (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR). *Zhurnal Evoliutsionnoi Biokhimii i Fiziologii*, vol. 18, Mar.-Apr. 1982, p. 193-196. 9 refs. In Russian.

**A82-31524 †** Conditioned reflexes in albino rats during space flight (Uslovnye refleksy belykh krysi vo vremia kosmicheskogo poleta). Z. I. Apanasenko, M. A. Kuznetsova, E. S. Meizerov, and L. V. Serova. *Zhurnal Vyshei Nervnoi Deiatel'nosti*, vol. 32, Mar.-Apr. 1982, p. 263-268. 12 refs. In Russian.

The state of conditioned reflex activity in rats during exposure to space flight conditions is investigated. Albino rats who had been conditioned to sounds and light flashes signalling the appearance of food were flown on board the Cosmos 1129 biosatellite for a period of 18.5 days, and the state of the reflex was evaluated according to the latency and intensity of the response to different signal levels. During the flight, a reduction in the level of conditioned reflex activity was observed: the number of omissions increased while the magnitude of the response decreased and the latency increased. By the 7th-12th day of flight, the normal intensity relations had been impaired by phase equalization, and a tendency towards the disinhibition of differentiation was noted. The changes may be explained by a weakening of both nervous processes fundamental to the reflex, with the more sensitive inhibitory process more affected than the excitatory process. A.L.W.

**A82-31525 †** The organ of vision and medicines used in treating psychological disorders (Survey) (Lekarstvennaia terapiia psikhicheskikh zabolevanii i organ zreniia /Obzor/). I. L. Golt'dovskaia (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Zhurnal Nevropatologii i Psikiatrii im. S. S. Korsakova*, vol. 82, Mar. 1982, p. 119-126. 125 refs. In Russian.

It is noted that cases of extreme damage to the eyes from medicines used in treating psychological disorders are becoming scarcer as the toxic side effects of these medicines become known. The effects, both immediate and long-term, of chlorpromazine hydrochloride are discussed, noting that large doses can damage the cornea. Attention is also given to the effect on the eye of tranquilizers, antidepressants, and lithium salts. C.R.

**A82-31526 †** Effects of hyperbaric oxygenation on homocarnosine metabolism in the brains of rabbits of various ages (Vliianie

giperbaricheskoi oksigenatsii na obmen gomokarnozina v mozge krolikov raznogo vozrasta). A. A. Krichevskaya, T. I. Bondarenko, N. V. Malysheva, and I. A. Pozhmatkina (Rostovskii Gosudarstvennyi Universitet, Rostov-on-Don, USSR). *Voprosy Meditsinskoi Khimii*, vol. 20, Mar.-Apr. 1982, p. 125-128. 17 refs. In Russian.

**A82-31527 †** Adaptation of skeletal and cardiac muscle to elevated motor activity in hypo- and athyreotic rats (Adaptatsiia skeletnykh i serdechnoi myshts k povyshennoi dvigatel'noi aktivnosti u gipo- i atireoidnykh kryss). T. P. Seene, K. P. Alev, K. E. Tomson, and A. A. Viru (Tartuskii Gosudarstvennyi Universitet, Tartu, Estonian SSR). *Voprosy Meditsinskoi Khimii*, vol. 20, Mar.-Apr. 1982, p. 20-24. 23 refs. In Russian.

**A82-31528 †** Preventing disturbances to the structure of DNA in the cardiac muscle from emotional-nociceptive stress by blocking beta-adrenoreceptors and the peroxidation of lipids (Preduprezhdenie narusheniia struktury DNK serdechnoi myshtsy, vyzvannykh emotsional'no-bolevym stressom s pomoshch'iu blokady beta-adrenoretseptorov i perekisnogo okisleniia lipidov). F. Z. Meerson and V. K. Vasil'ev (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Voprosy Meditsinskoi Khimii*, vol. 20, Mar.-Apr. 1982, p. 115-118. 15 refs. In Russian.

**A82-31529 †** Mechanism for fluctuations in cell cycle duration (O mekhanizme fluktuatsii dlitel'nosti kletchnogo tsikla). E. I. Volkov and A. T. Mustafin (Akademiia Nauk SSSR, Fizicheskii Institut, Moscow, USSR). *Biofizika*, vol. 27, Mar.-Apr. 1982, p. 304-308. 15 refs. In Russian.

Fluctuations in the duration of the cell cycle are examined in terms of a dynamic model of the membrane regulation of cell division. The model is based on the oxidation of membrane lipids as the principal self-oscillation process determining the rate of cell division according to changes in lipid mobility. The presence of white noise in the parameters determining the influxes of lipids and antioxidants in the membrane is simulated by methods of Markov processes and probability modeling. An equation for the distribution of cell generation times is obtained and the increase in dispersion and mean cycle time upon variations in system parameters related to the density of cell cultures is calculated. Results are in qualitative agreement with experimental data. A.L.W.

**A82-31530 †** Calculation of the isochromatics and isoclinics of the cornea (Raschet izokhrom i izoklin rogovoi obolochki glaza). M. A. Pen'kov, G. M. Altukher, and M. L. Kochina (Khar'kovskii Meditsinskii Institut, Kharkov, Ukrainian SSR; Nauchno-Issledovatel'skii Institut Prirodnnykh Gazov, Moscow, USSR). *Biofizika*, vol. 27, Mar.-Apr. 1982, p. 313-316. 11 refs. In Russian.

A method is presented for calculating tensions in the cornea induced by the mechanical influence of oculomotor muscles and intraocular pressure. The influence of the gradient thickness of the cornea on the shape of isochromatics is determined, and the nature of the cornea cross, representing lines of principal tensions (isoclinics), is investigated. The method is suitable for calculating the tensions of both healthy eyes and eyes with oculomotor pathology. B.J.

**A82-31531 †** Theoretical conformational analysis of the neuropeptide inducing delta sleep (Teoreticheskii konformatsionnyi analiz neuropeptida, indutsiruiushchego del'ta-son). A. A. Akhrem, S. G. Galaktionov, V. P. Golubovich, and L. I. Kirnarskii (Akademiia Nauk Belorusskoi SSR, Institut Bioorganicheskoi Khimii; Vsesoiuznyi Nauchno-Issledovatel'skii Institut Genetiki i Selektitsii Promyshlennyykh Mikroorganizmov, Minsk, Belorussian SSR). *Biofizika*, vol. 27, Mar.-Apr. 1982, p. 324, 325. In Russian.

**A82-31532 †** Effects of creatine phosphate on action potential duration and myocardial contractile force in the frog under hypoxia (Vlianie kreatinfosfata na dlitel'nost' potentsialov deistviia i silu sokracheniia miokarda liagushki pri gipoksii). V. I. Genovilene and E. V. Narushevichus (Kaunasiskii Meditsinskii Institut, Kaunas, Lithuanian SSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Mar. 1982, p. 3-5. 7 refs. In Russian.

**A82-31533 †** Dynamics of changes in animal body mass and skeletal musculature under conditions of hypokinesia (Dinamika

izmenenii massy tela zhivotnykh i ikh skeletnoi muskulatury v usloviakh gipokinezii). E. V. Kocherezhkina (Akademiia Nauk SSSR, Institut Evoliutsionnoi Morfologii i Ekologii Zhivotnykh, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Mar. 1982, p. 118, 119. 14 refs. In Russian.

The responses of body mass and the skeletal musculature of young animals growing under conditions of limited motor activity are traced in rats kept in restrictive cages for a period of 2 months. Animals maintained in cages preventing them from turning around exhibited signs of a high stress reaction and lost a significant amount of weight after three weeks, after which the experiment was terminated. Those given slightly more room showed signs of adaptation after several days and a weight gain from 125 to 180 g after 2 months, whereas control animals showed a weight gain to 330 g in the same time period. Muscular indexes and gastrocnemius muscle masses are also observed to be greater in the controls. Results demonstrate the influence of hypokinesia on muscle growth, and are supported by the discovery of smaller muscle fiber diameters in the constrained rats. A.L.W.

**A82-31534 †** Experimental model with a supplementary source of endogenous serotonin (Eksperimental'naia model' s dopolnitel'nym istochnikom endogennoho serotoninina). N. K. Popova, N. N. Kudriavtseva, T. V. Guvakova, and N. M. Enishevskaya (Akademiia Nauk SSSR, Institut Tsitologii i Genetiki; Novosibirskii Gosudarstvennyi Universitet, Novosibirsk, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Mar. 1982, p. 99-101. 11 refs. In Russian.

An experimental model providing a long-term source of supplementary endogenous serotonin is presented. The model makes use of gastrointestinal tract sections from embryo mice transplanted under the skin of adult mice of the same strain as sources of additional serotonin. Morphological studies of transplants after 30-40 days have shown them to be similar in cell composition to the corresponding sections of intact embryos, particularly as regards the serotonin-containing enterochromaffin and mast cells. Biochemical studies have shown the presence of serotonin in the transplants, and elevated serotonin levels in the blood, although not the brain, of the recipients. The model is thus suitable for studies of the role of serotonin in the peripheral regulation of physiological systems. A.L.W.

**A82-31535 †** The role of lymphocytes in the regeneration of hematopoiesis under condition of local irradiation (Ob uchastii limfotsitov v regeneratsii krovetvoreniia v usloviakh lokal'nogo obлучeniia organizma). E. D. Gol'dberg and A. M. Dygai (Tomskii Meditsinskii Institut, Tomsk, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Mar. 1982, p. 97-99. 13 refs. In Russian.

The role of lymphocytes in the regulation of the proliferation, differentiation and migration of hematopoietic stem cells following the local irradiation of the bone marrow is investigated. Experiments involved the evaluation of the numbers of nucleated cells in the thymus, spleen and bone marrow of mice exposed to a dose of 7.0 gram-roentgens of X radiation. An accumulation of lymphocytes is observed in the bone marrow of both irradiated and shielded limbs one day after irradiation, although by the fifth day lymphocyte numbers in the shielded limb were normal but rose sharply in the irradiated limb. Lymphocytosis in both irradiated and shielded hematopoietic tissues was less marked in thymectomized animals and in animals treated with antithymocytic heterologous serum, however was restored by the injection of viable thymocytes. The lymphocytosis observed after the first day had no effect on the colony forming activity of the hematopoietic tissues, while that developing on the fifth day stimulated colony-forming activity, apparently related to lymphocyte function in stimulating the regeneration of hematopoiesis. A.L.W.

**A82-31536 †** Destructive and reparative processes in the hippocampus upon prolonged exposure to nonionizing microwave radiation (Destruktivnye i reparativnye protsessy v gippokampe pri dlitel'nom vozdeistvii neioniziruiushchikh mikrovolnovykh izlucheniia). V. S. Belokrinitskii (Ministerstvo Zdravookhraneniia Ukrainiskoi SSR, Kievskii Nauchno-Issledovatel'skii Institut Obshchei i Kommunal'noi Gigieny, Kiev, Ukrainian SSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 93, Mar. 1982, p. 89-92. 7 refs. In Russian.

Ultrastructural changes in the brain upon long-term exposure to low doses of nonionizing microwave radiation are investigated. Electron microscopic examinations were conducted of the hippocampi of rats exposed to various intensities of 12.6-cm radiation for 40 min three times daily for a period of 2 months. Ultrastructural changes including vacuolization, regressive myelin transformation, nonequilibrium neurofibrillar stretching and fragmentation, mitochondrial swelling and darkening (densification) were observed in the alveus, polymorphic cell and pyramidal cell layers of the hippocampi of rats irradiated at 1000 microwatt/sq cm, and to lesser extents in animals irradiated at levels down to 10 microwatt/sq cm. The pattern of the changes demonstrates the presence of both destructive and reparative processes occurring simultaneously in the same cell, which may represent a mechanism of pathogenesis in humans exposed to environmental microwaves. A.L.W.

**A82-31537 †** Electrophysiological studies of the auditory-receptor function in the case of the combined injection of kanamycin and lasix (Elektrofiziologicheskie issledovaniia funktsii slukhovogo retseptora pri sochetannom vvedenii kanamitsina i laziksa). R. M. Khanamirian, B. I. Dunaivtser, and T. G. Tatevosian (Ministerstvo Zdravookhraneniia SSSR, Erevanskii Institut Usovershenstvovaniia Vrachei, Yerevan, Armenian SSR). *Vestnik Otorinolaringologii*, Mar.-Apr. 1982, p. 10-14. 13 refs. In Russian.

The effect of the combined intravenous injection of therapeutic doses of kanamycin and lasix on the cochlear bioelectric response was investigated in acute experiments on 30 cats. It is shown that the amplitude of microphone potentials responding to tonal stimulations of 250, 1000, and 5000 Hz and axonal potentials responding to short sound snaps decreases beginning with the 15th minute. A maximum decrease of the bioelectric amplitude is observed two to three hours after injection. Gradual, almost complete recovery of the amplitude in five hours was recorded. The results indicate that the ototoxic effect produced by the combined injection of therapeutic doses of kanamycin and lasix is reversible. B.J.

**A82-31538 †** Electrometric studies of the human gustatory analyzer in healthy persons and in the simulation of weightlessness (Elektrometricheskoe issledovanie vkusovogo analizatora cheloveka v norme i pri modelirovani nevesomosti). I. Ia. Iakovleva (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *Vestnik Otorinolaringologii*, Mar.-Apr. 1982, p. 15-17. 9 refs. In Russian.

An electrogustometer was used to study the threshold sensitivity of taste receptors to electrical stimulation as well as gastrolingual reflex parameters for 62 healthy men aged 25 to 45. Fifty-three men were used as controls, while nine men were examined under conditions of strict bed rest during five days, with a bed head slope of 8 deg. This brought about a statistically significant increase in gustatory thresholds, and a change in the direction of the gastrolingual reflex (seven men) and its inhibition (two men). B.J.

**A82-31539 †** Foreign body extraction from the left pteropalatine fossa under fluoroscope control (Udalenie inorodnogo tela iz levoi krylonebnoi iamki pod kontrolem rentgenotelevizionnoi ustanovki). M. V. Seniukov, V. G. Andreev, and M. V. Romanova (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR). *Vestnik Otorinolaringologii*, Mar.-Apr. 1982, p. 1. In Russian.

**A82-31540 †** Quantitative evaluation of hoarseness using a computer (Kolichestvennaia otsenka okhriplosti s ispol'zovaniem EVM). V. D. Uloza, Iu. M. Otriashenkov, A. D. Ronzin, and B. V. Zubkov (I Moskovskii Meditsinskii Institut, Moscow, USSR). *Vestnik Otorinolaringologii*, Mar.-Apr. 1982, p. 41-44. 19 refs. In Russian.

**A82-31541 †** Investigation of the sensitivity of the vestibular apparatus to galvanic-current stimulation (Issledovanie chuvstvitel'nosti vestibuliarnogo apparata k razdrazheniiu gal'vanicheskimi tokami). Iu. P. Syromiatnikov and V. G. Ovakimov (Ministerstvo Zdravookhraneniia RSFSR, Moskovskii Nauchno-Issledovatel'skii Institut Gigieny, Moscow, USSR). *Vestnik Otorinolaringologii*, Mar.-Apr. 1982, p. 33-37. 16 refs. In Russian.

The use of vestibular galvanometry to examine a control group of practically healthy subjects has made it possible to determine vestibular thresholds of sensitivity to galvanic-current stimulation in women. Vestibular sensitization in response to the current was noted

in subjects of the same occupation (weavers working for about 20 years), showing vegetovascular dysfunction after long-term exposure to low-frequency production-related vibration and noise. The use of the vestibular galvanometric method for the purpose of occupational screening is considered. B.J.

**A82-31542 †** Eight-hour rhythm of autonomic regulation (Vos'michasovoi ritm vegetativnoi regulatsii). A. I. Bogaty' (Kievskii Nauchno-Issledovatel'skii Institut Neirokhirurgii, Kiev, Ukrainian SSR). *Vrachebnoe Delo*, Mar. 1982, p. 79-81. In Russian.

Twenty-one examinations of the dynamics of the rate of heart contractions in the course of 24 hours have been performed. An intradiurnal (ultradianic) rhythm with a period of about eight hours has been disclosed. Extremal values of the rhythm with an average probability of 0.83 were found at 1, 9, and 17 hours (sympathetic peaks) and at 5, 13, and 21 hours (parasympathetic peaks). B.J.

**A82-31543 †** Psychotherapeutic use of sleep deprivation in treating insomnia produced by psychic soporific dependence (Ispol'zovanie deprivatsii sna v psikhoterapii bessonnitsy, vyzvannoi psikhicheskoi zavisimosti' ot snotvornyykh). V. I. Litvinenko and A. P. Krylovskii (Geikovskaia Oblastnaia Psikhiatricheskaiia Bol'nitsa, Dnepropetrovsk, Ukrainian SSR). *Vrachebnoe Delo*, Mar. 1982, p. 104-106. In Russian.

**A82-31544 †** Paradoxical akinesia syndrome in cases of acute carbon monoxide poisoning (Sindrom paradoksal'noi akinezii pri ostrykh otravleniiakh okis'iu ugleroda). A. A. Lomova, S. K. Evtushenko, Iu. G. Garina, R. A. Voinar, D. P. Terent'eva, S. A. Kharitonov, and A. A. Greshchenko (Donetskii Meditsinskii Institut; Oblastnaia Klinicheskaiia Bol'nitsa Professional'nykh Zabolevaniy, Donetsk, Ukrainian SSR). *Vrachebnoe Delo*, Mar. 1982, p. 101-103. 7 refs. In Russian.

**A82-31545 †** Functional-morphological characteristics of microvessels of the rat liver under hypokinesia (Funktsional'no-morfologicheskie osobennosti mikrososudov pecheni krysa v usloviakh gipokinezii). G. M. Knipshe (I Leningradskii Meditsinskii Institut, Leningrad, USSR). *Arkhiv Anatomii, Gistologii i Embriologii*, vol. 82, Mar. 1982, p. 50-56. 23 refs. In Russian.

Hypokinesia was produced in 86 non-inbred white rats by putting the animals in pencil boxes for 1, 2, and 4 weeks. Changes in specific volumes of various hepatic microvessels under hypokinesia and under hypokinesia combined with metaperon administration were investigated steriologically. The hypokinesia produced certain changes in the specific volume of all the hepatic microvessels studied, but the degree and character of the volumetric relations between the microvessels were different. Under metaperon administration, volumetric changes in the microvessels occurred with greater regularity. B.J.

**A82-31546 †** Effects of high-frequency ultrasound on adaptive changes in cell resistance (Vliianie vysokochastotnogo ultrazvuka na adaptivnye izmeneniia ustoiчивosti kletok). V. P. Plevinskii (Odesskii Nauchno-Issledovatel'skii Institut Glaznykh Boleznei i Tkanevoi Terapii, Odessa, Ukrainian SSR). *Arkhiv Anatomii, Gistologii i Embriologii*, vol. 82, Mar. 1982, p. 56-59. 8 refs. In Russian.

The reparative and protective effects of ultrasound on retinal cells are investigated in the light of the use of ultrasound in the treatment of several ocular conditions. Actinomycin D was used to induce metabolic disturbances in the retinas of rabbits which had either undergone multiple ocular exposures to ultrasound at a frequency of 880 kHz and intensity 0.4-0.6 W/sq cm, or subsequently underwent ultrasonic irradiation. Evaluations of RNA and total protein contents in the cytoplasm of ganglionic cells and photoreceptor cell nuclei indicate subsequent ultrasonic treatment to suppress or reduce the inhibitory effects of actinomycin given in small doses, although not the effects of large doses of the antibiotic. Preliminary ultrasound treatments, on the other hand, increase the metabolic resistivity of retinal cells to the damaging effects of actinomycin D, so that minimal cytochemical disorders are present following its administration. A.L.W.

**A82-31547 †** The use of a phytochrome-dependent reaction to assess the influence of space flight factors on a plant organism (Ispol'zovanie fitokhromzavisimoi reaktsii pri otsenke vliianiia faktorov

rov kosmicheskogo poleta na rastitel'nyi organizm). B. A. Shteine, L. V. Nevzgodina, and A. T. Miller (Akademiia Nauk Latvinskoi SSR, Institut Biologii, Riga, Latvian SSR). *Akademiia Nauk Latvinskoi SSR, Izvestiia*, no. 11, 1981, p. 94-99. 16 refs. In Russian.

Experimental results are presented concerning the effect of space flight factors on lettuce seeds, tested on the Cosmos-936 and Cosmos-1129 satellites in the course of 20 days. The phytochrome-dependent reaction (PDR) of photosensitive seeds was used as the criterion to assess the biological effect of space flight factors. It is found that the PDR of dry seeds was inhibited after space flight, particularly if they were exposed to open space during flight. After flight, both the Phi-660 and Phi-730 dependent reactions were found to be inhibited. B.J.

**A82-31548 †** Rapid diagnostic systems - A principle for diagnostic preparations and an analysis of the rapid systems (Diagnosticheskie rapid-sistemy - Perspektivnyi printsip konstruirovaniia diagnosticheskikh preparatov i raschet rapid-system). Iu. A. Ratiner (Moskovskii Nauchno-Issledovatel'skii Institut Vaksinn i Syvorotok, Moscow, USSR). *Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii*, Jan. 1982, p. 22-26. 5 refs. In Russian.

With advances in microbiology, the number of microorganisms known to cause infectious diseases is increasing. This has led to an increase in the number of serums for diagnostic use. Diagnostic practice today uses polyvalent serums to determine the class of microorganisms and monovalent serums to make the final identification. With the rapid system, antibodies are distributed among polyvalent serums in such a way that monovalent serums become unnecessary. C.R.

**A82-31549 †** Change in the volume density of hypothalamic neurons during prolonged immobilization-nociceptive stress (Izmenenie ob'emnoi plotnosti neuronov gipotalamusa kry's pri dlitel'nom immobilizatsionno-bolevom strese). V. B. Pisarev (Volgogradskii Meditsinskii Institut, Volgograd, USSR). *Problemy Endokrinologii*, vol. 28, Mar.-Apr. 1982, p. 60-63. 8 refs. In Russian.

**A82-31597 †** Liquid-crystal state of nucleic acids in solution (Zhidkokristallichesko'e sostoiianie nukleinovyykh kislot v rastvore). Iu. M. Evdokimov and Ia. M. Varshavskii (Akademiia Nauk SSSR, Institut Molekuliarnoi Biologii, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 5, 1982, p. 1254-1257. 15 refs. In Russian.

Experimental results are presented which indicate the existence of a mesophase state of DNA molecules in aqueous salt solutions of polyethylene glycol. The observed optical properties of this mesophase state can be interpreted in the light of two models of polymeric liquid crystals. According to one model, phase separation produces layers of parallelly arranged DNA molecules, each successive layer being turned at a certain angle with respect to the preceding layer; in this case, twisting occurs in the direction perpendicular to the long axes of the DNA molecules. According to the other model, the DNA molecules form columnar structures, and twisting occurs along the long axes of the DNA molecules. B.J.

**A82-31598 †** The role of methylation and  $Ca^{2+}$  in the photoaxis of *Halobacterium halobium* (Rol' metilirovaniia i  $Ca^{2+}$  v fototaksise *Halobacterium halobium*). V. A. Baryshev and A. N. Glagolev (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 5, 1982, p. 1261-1265. 15 refs. In Russian.

**A82-31599 †** The  $Na^{+}$ -induced release of  $Ca^{2+}$  from the sarcoplasmic reticulum during the excitation of phasic muscle fibers (O  $Na^{+}$ -indutsiruemom vysvobozhdenii  $Ca^{2+}$  iz sarkoplazmaticheskogo retikuluma pri vzbuzhdenii faznykh myshechnykh volokon). V. P. Nesterov, Iu. N. Demina, and N. A. Maksimov (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 5, 1982, p. 1267-1270. 12 refs. In Russian.

## STAR ENTRIES

**N82-22867\*#** Tufts Univ., Medford, Mass. Dept. of Physics.  
**PROTEIN FOLDING, PROTEIN STRUCTURE AND THE ORIGIN OF LIFE: THEORETICAL METHODS AND SOLUTIONS OF DYNAMICAL PROBLEMS**

D. L. Weaver Mar. 1982 50 p refs

(NASA Order A-86784-B)

(NASA-CR-166318; NAS 1.26:166318) Avail: NTIS  
 HC A03/MF A01 CSCL 06C

Theoretical methods and solutions of the dynamics of protein folding, protein aggregation, protein structure, and the origin of life are discussed. The elements of a dynamic model representing the initial stages of protein folding are presented. The calculation and experimental determination of the model parameters are discussed. The use of computer simulation for modeling protein folding is considered. B.W.

**N82-22868\*#** National Aeronautics and Space Administration, Washington, D. C.

**THE EFFICIENCY COEFFICIENT OF THE RAT HEART AND MUSCULAR SYSTEM AFTER PHYSICAL TRAINING AND HYPOKINESIA**

Yu. S. Alyukhin and A. F. Davydov Apr. 1982 12 p refs  
 Transl. into ENGLISH from Fiz. Zh. SSSR im I. M. Sechenova (USSR), v. 66, no. 11, 1980 p 1660-1665 Transl. by Scientific Translation Service, Santa Barbara, Calif.

(Contract NASw-3542)

(NASA-TM-76843; NAS 1.15:76843) Avail: NTIS  
 HC A02/MF A01

The efficiency of an isolated heart did not change after prolonged physical training of rats for an extreme load. The increase in oxygen consumption by the entire organism in 'uphill' running as compared to the resting level in the trained rats was 14% lower than in the control animals. Prolonged hypokinesia of the rats did not elicit a change in the efficiency of the isolated heart. S.L.

**N82-22869\*#** National Aeronautics and Space Administration, Washington, D. C.

**INTRACELLULAR MECHANISM OF THE ACTION OF INHIBIN ON THE SECRETION OF FOLLICULAR STIMULATING HORMONE AND OF LUTEINIZING HORMONE INDUCED BY LH-RH IN VITRO**

M. J. Lecomte-Yerna, M. T. Hazee-Hagelstein, Ch. Charlet-Renard, and P. Franchimont Apr. 1982 8 p refs Transl. into ENGLISH from Compt. Rend. des Seances (France), v. 175, no. 3, 1981 p 385-388 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Societe de Biologie et de ses Filiales

(Contract NASw-3541)

(NASA-TM-76847; NAS 1.15:76847) Avail: NTIS  
 HC A02/MF A01 CSCL 06C

The FSH secretion-inhibiting action of inhibin in vitro under basal conditions and also in the presence of LH-RH is suppressed by the addition of MIX, a phosphodiesterase inhibitor. In the presence of LH-RH, inhibin reduces significantly the intracellular level of cAMP in isolated pituitary cells. In contrast, the simultaneous addition of MIX and inhibin raises the cAMP level, and this stimulation is comparable to the increase observed when MIX is added alone. These observations suggest that one mode of action of inhibin could be mediated by a reduction in cAMP within the pituitary gonadotropic cell. Author

**N82-22870\*#** National Aeronautics and Space Administration, Washington, D. C.

**BEHAVIORAL STUDY OF ULTRADIAN ACTIVITY PERIODS OF F1 MICE ENCLOSED IN EXPERIMENTAL CAGES OF DIFFERENT DIMENSIONS**

A. Guillot Apr. 1982 13 p refs Transl. into ENGLISH from Comptes Rend. des Seances de la Soc. de Biol. et de ses Filiales (France), v. 175, no. 3, 1981 p 295-302 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by

Inst. National de la Sante et de la Recherche Medicale, Paris (Grant NASw-3541)

(NASA-TM-76848) Avail: NTIS HC A02/MF A01 CSCL 06C

Male mice are enclosed in cages of different dimensions (cage A - 23x8x8 cm., cage B - 36x27x17 cm.), in an alternating light/dark regimen, at an ambient temperature of 22 to 23 C. The successions of the behavioral sequences of ultradian activity periods are noticed by direct observation during 11 consecutive hours in light. The experimental situation modifies the mean duration time and the behavioral organization of each activity period. However, the comparison of the overall activity time lengths and the comparison of the overall behavioral frequencies suggest that the energy spent per mouse is constant. J.M.S.

**N82-22871#** Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

**PRELIMINARY STUDY OF THE EFFECTS OF PROLONGED ACCELERATION ON SPINAL DYNAMICS OF BABOONS. 1: ACCELERATION. 2: BIOMECHANICAL ANALYSIS**

Arnold R. Slonim, Marvin E. Souder, James H. Vechte, John W. Frazier, Arnold R. Slonim, and Leon E. Kazarian Jun. 1981 50 p refs

(AD-A101766; AFAMRL-TR-80-40)

Avail: NTIS  
 HC A03/MF A01 CSCL 06C

Repetitive exposures to acceleration are studied to determine if they have an effect on spinal dynamics; if they cause bone strength variations of predisposition to spinal injuries. Two baboons were exposed simultaneously to 10 plateaus of +4 Gz/30 seconds each separated by intervals of +1.5 Gz/45 seconds at the rate of two times per week for 26 weeks. The results are to control noncentrifuged baboons. Subsequently, the spinal columns of these baboons were subjected to extensive mechanical strength testing. Each vertebra of the two baboons exposed to +Gz acceleration twice a week for 26 weeks was subjected to axial compressive loading at the rate of 88 sq to the minus third power meter/sec (21 in./min) on a material testing machine. The data, analyzed by PDP 11/34 computer, were compared with data obtained previously from four noncentrifuged baboons of the same age, weight and sex. S.L.

**N82-22872\*#** National Aeronautics and Space Administration, Washington, D. C.

**CHANGE IN BLOOD GLUCOSE LEVEL IN RATS AFTER IMMOBILIZATION**

R. D. Platonov, G. M. Baskakova, and S. A. Chepurinov Dec. 1981 9 p refs Transl. into ENGLISH from Biol. Nauka (USSR), no. 9, 1975 p 37-40 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3199)

(NASA-TM-75997; NAS 1.15:75997) Avail: NTIS  
 HC A02/MF A01 CSCL 06C

Experiments were carried out on male white rats divided into four groups. In group one the blood glucose level was determined immediately after immobilization. In the other three groups, two hours following immobilization, the blood glucose level was determined every 20 minutes for 3 hours 40 minutes by the glucose oxidase method. Preliminary immobilization for 2 hours removed the increase in the blood glucose caused by the stress reaction. By the 2nd hour of immobilization in the presence of continuing stress, the blood glucose level stabilized and varied within 42 + or - 5.5 and 47 + or - 8.1 mg %. Within 2 hours after the immobilization, the differences in the blood glucose level of the rats from the control groups were statistically insignificant. Author

**N82-22873#** Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.

**THE EFFECT OF PULSED MICROWAVES ON THE BREATHING OF MICE [INVERKAN AV PULSADE MIKROVAGOR PAA ANDNING OCH KROPPSVIKT HOSS MOESS]**

C.-O. Criborn, C. I. Henriksson, and C.-J. Clemedson Apr. 1981 20 p refs In SWEDISH

(FOA-C-54032-H2, H3) Avail: NTIS HC A02/MF A01

With the use of a specially constructed microwave generator, mice were exposed to microwaves synchronized to the different stages of respiration. Frequencies other than the respiratory rate effect the volume and rate of respiration in shorter intervals of exposure. Even though the animals were not heated at the low average effect, approx. 1mW/sq cm during exposure, a change in body weight was measurable. These results



indicate that the thermal energy balance in mice is somehow effected. J.M.S.

**N82-22874#** Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.  
**THE ROLE OF BIOTECHNOLOGY IN THE DEVELOPMENT OF TECHNICAL SYSTEMS: A REFERENCE BACKGROUND**

Hans Furustig Jul. 1981 68 p refs In SWEDISH  
(FOA-C-56026-H2) Avail: NTIS HC A04/MF A01

Modern civilization depends on the function of manned technical systems in which people spend most of their time. For scientific, ethical, and pragmatic reasons, it is important to study problems and experiences from system development. Systems analysis, ergonomics, human factors and frame of reference are discussed. Transl. by A.R.H.

**N82-22875\*** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

**CERVIX-TO-RECTUM MEASURING DEVICE IN A RADIATION APPLICATOR FOR USE IN THE TREATMENT OF CERVICAL CANCER Patent**

David R. Fischell (Howard Univ.) and Jeffrey C. Mazique, inventors (to NASA) (Howard Univ.) Issued 13 Oct. 1981 5 p Filed 12 May 1977 Supersedes N77-26796 (15 - 17, p 2306) Continuation of abandoned US Patent Appl. SN-672209, filed 31 Mar. 1976 Sponsored by NASA  
(NASA-Case-GSC-12081-2; US-Patent-4,294,264; US-Patent-Appl-SN-796258; US-Patent-Appl-SN-672209; US-Patent-Class-128-778; US-Patent-Class-128-1.2; US-Patent-Class-33-143C) Avail: US Patent and Trademark Office CSCL 06B

A cervix-to-rectum measuring device to be used in the treatment of cervical cancer is described. It includes a handle and a probe pivotably connected to the handle for insertion in the rectum. The measuring device further includes means for coupling the handle to an intrauterine radiation applicator when the latter is positioned in the uterine cervix and the probe is inserted in the rectum to pivot the handle about the probe. A gear is provided which is adapted to pivot with the probe. A pinion pivotably connected to the handle meshes with the gear. A pointer fixed to the pinion is displaced in response to the pivoting of the handle about the probe, and this displacement can be read from a scale on the handle, providing an indication of the cervix-to-rectum distance.

Official Gazette of the U.S. Patent and Trademark Office

**N82-22876** Pennsylvania State Univ., University Park.  
**HEAT-ACTIVATED SWEAT GLAND DENSITIES DETECTED THROUGH MACROPHOTOGRAPHY IN LEAN AND OBESE MEN EXPOSED TO A WARM, HUMID ENVIRONMENT Ph.D. Thesis**

James Alexander Bell 1981 172 p  
Avail: Univ. Microfilms Order No. 8129140

Heat-activated sweat gland (HASG.cm-2) densities were quantified in lean and obese men to determine whether a significant inverse correlation between HASG and body surface area could be demonstrated. Heat exchange rates were also examined to determine if the heat exchange capacity of the obese is compromised due to fewer HASG. Twelve inactive men were divided into three equal groups. HASG were measured using a macrophotographic technique at four skin sites: forearm, chest, back, and thigh. Methacholine, a synthetic choline derivative biochemically similar to acetylcholine and synergistic to its action, was injected intradermally to ascertain maximal sweat gland activation. Other variables measured included skin and subcutaneous temperatures, rectal and esophageal core temperatures, heart rate, blood pressure, local and total body sweat rates, metabolic rate, and evaporation rate using an evaporimeter. HASG densities were not significantly different among the three groups. Dissert. Abstr.

**N82-22878#** Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

**AERODYNAMIC FORCES EXPERIENCED DURING EJECTION**

Arthur J. Nestle Feb. 1981 12 p refs  
(AF Proj. 7231)  
(AFAMRL-TR-80-16) Avail: NTIS HC A02/MF A01

Emergency egress exposes aircrew members to abrupt accelerative and windblast forces. For the time period January 1967 to December 1977, 399 ejections were made from the F-4 aircraft. Forty-three aircrewmen sustained 95 long bone and joint injuries. Of this number, 39 were identified as upper and 22 as lower extremity injuries. The region, nature, and severity of long bone and joint injuries resulting from aircraft ejection are identified. Known biomedical data on bone and joint strength were reviewed. T.M.

**N82-22879#** Northwestern Univ., Evanston, Ill. Dept. of Civil Engineering.

**ANALYSIS OF VERTEBRAL STRESS DISTRIBUTIONS AND EJECTION-RELATED INJURY MECHANISMS Final Technical Report, 1 Jul. 1977 - Jan. 1980**

M. Plesha and T. Belytschko Wright-Patterson AFB, Ohio AFAMRL Feb. 1981 51 p refs  
(Contract F33615-77-C-0526)  
(AD-A098639; AFAMRL-TR-80-67) Avail: NTIS HC A04/MF A01

Stress analyses of lumbar vertebrae were performed by a three dimensional finite element method for the purposes of evaluating simplified models of the vertebrae which are suitable as injury postprocessors, and gaining a better understanding of injury mechanisms. The finite element analyses were linear and elastic. Axial and moment loads were applied over the end plates to simulate G(Z) impact and on the facets to simulate load transmission between the articular facets and the vertebral bodies. The finite element model predicts that the maximum stresses under axial load are perpendicular to the axis of the vertebral body, which are called axial stresses; this is consistent with the predominance of compressive and wedge fractures. However, the maximum stresses predicted by the finite element model are only about a third of those predicted by the simplified injury model. This discrepancy is due to the fact that a substantial portion of the total load is transmitted through the vertebral centrum which is neglected in the simplified model. S.L.

**N82-22880#** Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio. Environmental Medicine Div.

**EFFECTS OF WHOLE AND PARTIAL BODY EXPOSURE TO DRY HEAT ON CERTAIN PERFORMANCE MEASURES**

John F. Courtright May 1981 63 p refs  
(AD-A100305; AFAMRL-TR-80-43) Avail: NTIS HC A04/MF A01

The effects on four performance measures of air of 65.6 C when the head was cooled with air of 15.6 C and without head cooling, were evaluated. Six subjects were exposed for 66 minutes to these environmental stressors and to two benign control tests. Humidity for all tests was maintained at 10 mm Hg partial water vapor pressure. The performance measures were mental arithmetic accuracy, choice reaction time, position compensation tracking, and rate compensation tracking. The tasks were presented in a repeating sequence throughout preexposure and exposure tests. Performance on all tasks showed the effects of the passage of time related to the gradual onset of fatigue. Preexposure reaction time performance and rate compensation tracking were better in the afternoon than in the morning. Performance on all tasks except position compensation tracking was influenced by differences in subject arousal level as indicated by body temperature measurements. The relationship between arousal level and reaction time stimulus information level was particularly pronounced. S.L.

**N82-22881#** National Mechanical Engineering Research Inst., Pretoria (South Africa). Special Projects Div.

**DEVELOPMENT OF THE CARBON FIBRE POLYSULPHONE TOGGLE FOR LIGAMENT REPAIR OPERATIONS**

M. S. Hunt May 1981 14 p ref  
(CSIR-ME-1709; ISBN-0-7988-14764) Avail: NTIS HC A02/MF A01

The selection of a simple kinked bar design, the toggle, for ligament repair operations was examined. The ligament repair operations are often carried out by using carbon fiber. The carbon fiber tows pass through a hole drilled in the bone so that they can be attached to the bone on its outer surface. The attachment can be done with a bollard and a number of successful operations have used this technique. A second hole is drilled adjacent to the hole through the bone but just deep enough for the insertion of the bollard and allows one or more tows to be attached in

this way. In practice the carbon fiber tow used for the ligament is doubled over on itself once or twice to give increased strength. This creates a loop at one end of the ligament and allows a much simpler method of attachment based on the use of the one hole only. Possibilities are studied which explore the possibilities of retaining both simplicity and security. E.A.K.

**N82-22882#** Rolls-Royce Ltd., Derby (England).

#### **ANALYSIS OF SICKNESS RATES**

Dieter Schittek 1981 23 p refs Transl. into ENGLISH from Fortschrittliche Betriebsführung u. Ind. Eng. (West Germany), v. 29, no. 5, 1980 p 247-252 In ENGLISH and GERMAN (PNR-90097; Trans-15573/TLT-00819) HC A02/MF A01

The unexpectedly high absenteeism in West Germany during an economic recession is discussed. The literature indicates Work content, worker expectations, management methods, performance assessment techniques, and degree of personal responsibility affect psychosomatic illness rates. Psychological factors are suggested as the cause of increases in somatic illness, since physiological stresses show a downward trend. Sociological influences are also important; lower tolerance of frustration and growing sensitivity to working conditions increase the probability that illness will occur as an abreaction of the unconscious arousal complexes to which dissatisfaction can give rise. Managers who place the responsibility for industrial relations on medical and social welfare experts are criticized. Managers should ensure that tasks challenge individuals' knowledge, skill, and experience, and that workers are divided into groups whose members work well together. Author (ESA)

**N82-22883#** European Space Agency, Paris (France).

#### **MICROGRAVITY AS AN ADDITIONAL TOOL FOR RESEARCH IN HUMAN PHYSIOLOGY: SIMULATION ON GROUND; EXPOSURE TO WEIGHTLESSNESS; DEVELOPMENT OF MULTI-USER FACILITIES**

Flemming Bonde-Petersen (Copenhagen Univ.), Helmut Hinghofer-Szalkay (Graz Univ.), and Jerry Hordinsky (DFVLR, Cologne) Jan. 1982 55 p refs

(Contract ESA-81/86-076-HUPHYS)

(ESA-BR-09; ISSN-0250-1589) Avail: NTIS HC A04/MF A01; ESA, Paris FF 60 Member States, AU, CN and NO (+20% others)

Micro-g cardiovascular and pulmonary studies are summarized. A plan for coordinating European ground based micro-g simulation studies is presented. A multiuser facility for ground use which can be transformed into a space qualified facility is described. Difficulties in micro-g simulation include: the impossibility of equalizing hydrostatic pressure in the circulatory system; equalizing lung perfusion; recreating the subjective feeling of weightlessness; skin maceration in water; increased diuresis; and negative pressure breathing. Standardization of experiments is hindered by the interlaboratory variety of: measuring methods; simultaneous countermeasures; subjects; positioning, support, diet, and hydration of subjects; and temperature influences. A ground based model of Anthrorack, supplemented with a microcomputer and bus system interfaced with standard testing and measuring equipment, is suggested as a means of overcoming these problems. Author (ESA)

**N82-22884#** Messerschmitt-Boelkow-Blohm G.m.b.H., Otto-brunn (West Germany). Unternehmensbereich Flugzeuge.

#### **ANALYSIS OF PILOT INPUT CONCEPTS AND DEVICES INTO INTEGRATED DISPLAY/CONTROL SYSTEMS**

Ruediger Seifert 21 Apr. 1981 21 p refs Presented at 32nd AGARD Symp. on the Impact of New Guidance and Control Systems on Military Aircraft Cockpit Design, Stuttgart, 5-8 May 1981

(M8B-FE-301/S/PUB/40) Avail: NTIS HC A02/MF A01

The concept of integrated display/control systems is addressed with emphasis on ergonomic requirements. Keyboard types, numeric input devices and positioning devices are discussed. Data handling concepts and layout criteria for fighter aircraft are also evaluated. J.M.S.

**N82-22885** Admiralty Marine Technology Establishment, Teddington (England).

#### **PERSONALISED TASK REPRESENTATION: DEVELOPMENTS**

R. Gregory Oct. 1981 21 p refs

(AMTE(E)-TM-81104; BR81584) Copyright. Avail: Issuing Activity

The logic underlying personalized task representation (PTR) and with the hermeneutical roots from which it grew are described. A central action node is encircled by when, why, how, and what next nodes. The what next node leads to the next action node. It is used for knowledge representation and the design of intelligent support systems. The logical relations of PTR are expressed in terms of a frame methodology as a step towards implementation of a PTR based system for the elicitation and representation of task knowledge. By anchoring subsequently elicited representations in task dependent primitives, the system potential for machine execution of the representations can be realized. Author (ESA)

**N82-22886#** ACCORD, Los Altos, Calif.

#### **APPLICATION OF GUIDED INQUIRY SYSTEM TECHNIQUE (GIST) TO CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEMS (CELSS) Final Report**

Henry Aroeste Jan. 1982 23 p

(NASA Order A-827058B; NASA Order A-89697B)

(NASA-CR-166312; NAS 1.26:166312) Avail: NTIS HC A02/MF A01 CSDL 06K

Guided Inquiry System Technique, a global approach to problem solving, was applied to the subject of Controlled Ecological Life Support Systems (CELSS). Nutrition, food processing, and the use of higher plants in a CELSS were considered by a panel of experts. Specific ideas and recommendations gleaned from discussions with panel members are presented. Author

**N82-22887#** National Research Inst. for Mathematical Sciences, Pretoria (South Africa).

#### **THE INVERSE DYNAMICS OF THREE-DIMENSIONAL HOMINOID MOTION**

H. Hatze Jun. 1981 37 p refs

(CSIR-SWISK-24; ISBN-0-7988-2127-2) Avail: NTIS HC A03/MF A01

Methods used for solving the inverse dynamics problem of three dimensional hominoid motion are described, and a user guide for the efficient implementation of the corresponding computer program is included. Kinetic and kinematic quantities used to solve the problem include: the internal joint torque vectors that generated the observed motion, the joint reaction force vectors, the linear and angular momentum vectors of the segments and the whole system, the mechanical energies of the segments and the whole system, the mechanical powers of the segments and the whole system, the position vector of the hominoid mass centroid, and the velocity vector of the hominoid mass centroid. S.L.

**N82-22888#** Research Inst. of National Defence, Umea (Sweden). Huvudavdelning 4.

#### **STUDY OF PROTECTIVE MASK TYPE 33 [OEVERSYN AV SKYDDSMASK TYP 33]**

Roger Sundqvist Apr. 1981 25 p In SWEDISH

(FOA-C-40134-C2) Avail: NTIS HC A02/MF A01

A functional evaluation of protective mask type 33 was made. The mask did not comply with civilian standards because the measured CO2 concentration was too high and the exhalation resistance needed to be lowered. Both factors are considered important for user's comfort and could easily be improved. The facial rim was not flexible enough to conform to different facial shapes, wrinkles or beards. The mask design could be significantly improved by changing its shape; this would necessitate retooling the mold. Some simple modifications of the present tools which could improve the mask's performance are discussed. M.D.K.

**N82-22889#** Research Inst. of National Defence, Stockholm (Sweden).

#### **RECOGNITION OF VEHICLE TARGETS FROM THE AIR: A FIELD TEST [IDENTIFIERING AV FORDONSMÅL FRAAN LUFTEN ETT FAELTFOERSOEK]**

Bjoern Norlin Nov. 1981 25 p refs In SWEDISH

(FOA-C-56027-H2) Avail: NTIS HC A02/MF A01

The distances at which a previously detected vehicle target can be identified was determined. The flight height was 100 m and the speed of the aircraft 190 Km/hr. Six persons without any experience in reconnaissance identified five vehicles with a virtually constant accuracy of 70% regardless of the distance. The length of the checked interval was 1 to 4.5 Km, but most of the answers were given at 2.5 Km from the target. Other

factors than distance influence on identification performance, indicating that the test persons used other decision making criteria. Author (ESA)

**N82-23109\*** Texas Southern Univ., Houston. Medical Research Branch.

**EXPERIMENTAL STUDY OF HIGH DENSITY FOODS FOR THE SPACE OPERATIONS CENTER Final Report**

Selina M. Ahmed /In Houston Univ. The 1981 NASA ASEE Summer Fac. Fellowship Program, Vol. 1 20 Aug. 1981 22 p refs

Avail: NTIS HC A14/MF A01 CSCL 06H

The experimental study of high density foods for the Space Operations Center is described. A sensory evaluation of the high density foods was conducted first to test the acceptability of the products. A shelf-life study of the high density foods was also conducted for three different time lengths at three different temperatures. The nutritional analysis of the high density foods is at present incomplete. M.D.K.

**N82-23110\*** Kentucky State Univ., Frankfort. Dept. of Biology.

**CARDIOVASCULAR ADAPTATIONS IN WEIGHTLESSNESS: THE INFLUENCE OF IN-FLIGHT EXERCISE PROGRAMS ON THE CARDIOVASCULAR ADJUSTMENTS DURING WEIGHTLESSNESS AND UPON RETURNING TO EARTH**

Charles H. Bennett /In Houston Univ. The 1981 NASA ASEE Summer Fac. Fellowship Program, Vol. 1 20 Aug. 1981 37 p refs

Avail: NTIS HC A14/MF A01 CSCL 06S

The effect of in-flight exercise programs on astronauts' cardiovascular adjustments during spaceflight weightlessness and upon return to Earth was studied. Physiological changes in muscle strength and volume, cardiovascular responses during the application of lower body negative pressure, and metabolic activities during pre-flight and flight tests were made on Skylab crewmembers. The successful completion of the Skylab missions showed that man can perform submaximal and maximal aerobic exercise in the weightless environment without detrimental trends in any of the physiologic data. Exercise tolerance during flight was unaffected. It was only after return to Earth that a tolerance decrement was noted. The rapid postflight recovery of orthostatic and exercise tolerance following two of the three Skylab missions appeared to be directly related to total in-flight exercise as well as to the graded, regular program of exercise performed during the postflight debriefing period. M.D.K.

**N82-23115\*** Houston Univ., Tex.

**ANTHROPOMETRIC DATA ERROR DETECTING AND CORRECTION WITH A COMPUTER**

David D. Chesak (St. Joseph's College) /In its The 1981 NASA ASEE Summer Fac. Fellowship Program, Vol. 1 20 Aug. 1981 12 p refs

Avail: NTIS HC A14/MF A01 CSCL 05H

Data obtained with automated anthropometric data acquisition equipment was examined for short term errors. The least squares curve fitting technique was used to ascertain which data values were erroneous and to replace them, if possible, with corrected values. Errors were due to random reflections of light, masking of the light rays, and other types of optical and electrical interference. It was found that the signals were impossible to eliminate from the initial data produced by the television cameras, and that this was primarily a software problem requiring a digital computer to refine the data off line. The specific data of interest was related to the arm reach envelope of a human being. M.D.K.

**N82-23124\*** Houston Univ., Tex.

**ANTHROPOMETRIC PROGRAM ANALYSIS OF REACH AND BODY MOVEMENT Final Report**

Charles J. McKinley /In its The 1981 NASA ASEE Summer Fac. Fellowship Program, Vol. 2 20 Aug. 1981 16 p refs

Avail: NTIS HC A17/MF A01 CSCL 05H

A multifaceted project involving tasks related to anthropometric data collection and comparison is discussed. Activities relating to human force and motion capabilities and information on astronaut candidates doing certain force and motion activities were studied. The subjects were suited, both in one-G and in

neutral buoyancy of a water facility, and also unsuited, in a one-G environment. Pieces of hardware used in quantification of the data collection were reviewed. The hardware included a CYBEX 2 force and torque machine, and a three dimension camera system (AMS) for measuring range of motion envelopes. Collecting techniques are compared and standardization of data collection is suggested. E.A.K.

**N82-23134\*** Virginia Univ., Charlottesville.

**OPTIMAL USE OF ELECTROPHYSIOLOGICAL INDICATORS OF MUSCULAR EFFORT AND FATIGUE Final Report**

Otis L. Updike /In Houston Univ. The 1981 NASA ASEE Summer Fac. Fellowship Program, Vol. 2 20 Aug. 1981 15 p refs

Avail: NTIS HC A17/MF A01 CSCL 06S

Electromyograms (EMG) from working muscles convey information on effort and fatigue. Their application, e.g., to assess the demands of vehicle control tasks, is complicated by the cooperative action of sets of muscles, by both intrinsic and imposed filtering, and by numerous other sources of variation. Fourier analyses of these noise like signals offer one approach to interpretation; downward spectral shifts accompany fatigue. Techniques are being sought (in both time and frequency domains) for further condensing the wideband EMG signals, while retaining essential information, into a concise 'state vector' usable in comparing control system designs. S.L.

**N82-23971\*** Washington Univ., Seattle. Dept. of Genetics. **NUMERICAL METHODS FOR INFERRING EVOLUTIONARY TREES**

Joseph Felsenstein Sep. 1981 42 p refs  
(Contracts DE-AM06-76RL-02225; DE-AT06-76EV-71005)  
(DE82-002295; DOE/EV-71005/61) Avail: NTIS HC A03/MF A01

For discrete characters whose ancestral states are known, the prescriptions of Hennig are well-defined, but their applicability only when there is no incompatibility between different characters has led to the elaboration of a number of methods for dealing with incompatibilities. One category is the parsimony methods, which choose that phylogeny on which the fewest changes of character state need be assumed. Another is the compatibility methods, which choose that phylogeny which is perfectly compatible with the largest number of characters, irrespective of how many changes need be assumed in other characters. Other approaches include the use of phenetic clustering algorithms and methods fitting trees to similarity or distance matrices. Each method has different implicit assumptions concerning the biology of the characters and the information available in the data. The biological assumptions and statistical behavior of each method are discussed. T.M.

**N82-23972\*** Clemson Univ., S.C.

**A STATISTICAL MODEL OF THE CONTROLLER FUNCTIONS OF THE HUMAN TEMPERATURE REGULATING SYSTEM Ph.D. Thesis**

Jeffrey Leo Ringuest 1981 128 p  
Avail: Univ. Microfilms Order No. 8126923

A model of the controller mechanisms of the human temperature regulating system was developed. In this context, three different controller responses were examined including: increases in metabolic heat production, increases in evaporative heat loss and modifications in surface blood flow. Additionally, upper and lower limits for each of these controller functions were researched. The relationship between the environmental temperature and the controller model form and parameters was investigated. Finally, it was necessary to statistically test the validity of the controller model that was developed. Data was analyzed using a least squares approach. This procedure involved fitting an equation to a controller response for a limited temperature range. A model of human responses to temperature stress in an air environment and in a water environment was developed which proved to be valid for a wide range of experimental conditions. Dissert. Abstr.

**N82-23973\*** Mississippi Univ., University.

**THE EFFECTS OF VARYING EXERCISE INTENSITIES AND DURATIONS ON PLASMA HIGH DENSITY LIPOPROTEIN-CHOLESTEROL, BODY COMPOSITION AND MAXIMUM OXYGEN CONSUMPTION Ph.D. Thesis**

Thomas John Birk 1981 169 p

Avail: Univ. Microfilms Order No. 8128089

Forty-three sedentary men twenty-three to thirty-eight years of age after being randomly assigned to either one of four experimental treatment groups or an inactive control group completed a fifteen week, three day per week experimental exercise training period. Results indicated that high density lipoprotein-cholesterol was increased during a seven and one-half to fifteen weeks, three days per week, exercise program of moderate intensity and lower to moderate duration. Percent body fat was decreased most effectively by a higher intensity of workload. A higher intensity and longer duration (80 percent of the difference for thirty minutes) was more effective than other exercise intensities and durations for significantly increasing maximum oxygen consumption. There was also a significant inverse relationship between maximum oxygen consumption and percent body fat at seven and one-half and fifteen weeks of three days per week jogging exercise. Dissert. Abstr.

**N82-23975#** Medical Biological Lab. RVO-TNO, The Hague (Netherlands).

**DISTURBANCES IN THE CARBOHYDRATE METABOLISM IN SHOCK. 3: EXPERIMENTAL HEMORRHAGIC SHOCK AND SOME SHOCK MODELS. REVIEW OF THE LITERATURE**

C. vanderMeer Jun. 1980 81 p In DUTCH; ENGLISH summary

(MBL-1980-10; TDCK-71318) Avail: NTIS HC A05/MF A01

Literature concerning disturbances in the carbohydrate metabolism in experimental hemorrhagic shock, traumatic shock, burns and cardiac shock is reviewed. General observations are a hyperglycemia especially in the early stages of shock (presumably caused by an increased release of catecholamines), sometimes followed in later stages by glycogen depletion in the liver and hypoglycemia. In addition an increased level of plasma lactate and pyruvate, acidosis and a decrease in energy rich phosphates in a number of organs are found. Except for the assumption that these changes may be caused by hypoxia in the liver and other organs, as yet nothing is known with certainty about the origin and nature of the disturbances in the carbohydrate metabolism. Therapeutic effects a.o glucose, glucose-insulin-KC1, glucocorticoids, ATP-MgCl<sub>2</sub>, naloxone, neuroleptics and neuroleptanalgesia and the adrenergic blocking agents WR-149, 024 and WR-2823 are described. S.L.

**N82-23976#** Thermo Electron Corp., Waltham, Mass.  
**EVALUATION OF LEFT VENTRICULAR ASSIST DEVICE PUMP BLADDERS CAST FROM ION-SPUTTERED POLYTETRAFLUORETHYLENE MANDRELS**

Mar. 1982 103 p refs

(Contract NAS3-22476)

(NASA-CR-167904; NAS 1.26:167904; TE200-230-82) Avail: NTIS HC A06/MF A01 CSCL 06B

A highly thromboresistant blood contacting interface for use in implantable blood pump is investigated. Biomaterials mechanics, dynamics, durability, surface morphology, and chemistry are among the critical consideration pertinent to the choice of an appropriate blood pump bladder material. The use of transfer cast biopolymers from ion beam textured surfaces is investigated to detect subtle variations in blood pump surface morphology using Biomer as the biomaterial of choice. The efficacy of ion beam sputtering as an acceptable method of fabricating textured blood interfaces is evaluated. Aortic grafts and left ventricular assist devices were implanted in calves; the blood interfaces were fabricated by transfer casting methods from ion beam textured polytetrafluorethylene mandrels. The mandrels were textured by superimposing a 15 micron screen mesh; ion sputtering conditions were 300 volts beam energy, 40 to 50 mA beam, and a mandrel to source distance of 25 microns. S.L.

**N82-23977#** Royal Naval Personnel Research Committee, London (England).

**[MEDICAL RESEARCH OF NAVAL PERSONNEL] Progress Report, Jan. 1979 - Jul. 1981**

Jul. 1981 15 p refs

(RNP-3/81; BR82205) Copyright. HC A02/MF A01

Research into biological, medical, physiological and psychological problems affecting the health and fighting efficiency of naval personnel is summarized. No safe and simple test of the physical fitness of an individual on a single occasion was found. The cognitive efficiency of divers is impaired during prolonged dives at depths > 300 m. No long-term adverse effects result

from breathing air with CO<sub>2</sub> level = 0.5%. For CO, 15 ppm in air is safe. Afterdrop in deep body temperature, following cold water immersion can be accounted for by a physical mechanism; postimmersion death is attributed to vasomotor collapse. Maximum noise exposure levels recommended for divers working near sonar sources are 175 db for nonhooded and 185 db for hooded divers. Motion sickness affects 75% of sailors during their service life. When a 25 man liferaft is closed down, toxic levels of CO<sub>2</sub> are reached within 25 min. Author (ESA)

**N82-23978#** Kentucky Univ., Lexington. Biomedical Engineering Lab.

**RESPONSE OF THE CARDIOVASCULAR SYSTEM TO VIBRATION AND COMBINED STRESSES Progress Report, 1 Oct. 1980 - 30 Sep. 1981**

Charles F. Knapp, Joyce M. Evans, and David C. Randall Nov. 1981 66 p refs

(Grant AF-AFOSR-0039-80; AF Proj. 2312)

(AD-A110494; AFOSR-82-0019TR)

Avail: NTIS

HC A04/MF A01 CSCL 06/19

The research effort of the past year was divided into three phases, each of which adds to our systematic investigation of the frequency response characteristics of cardiovascular regulation. The frequency response characteristics are obtained from the analysis of pressure, flow and heart volume responses to low frequency, sinusoidal acceleration (0.001 to 0.25 Hz + or - 2g). The 3 phases are: (1) Heart volume measurements in unblocked and autonomically blocked, normal and cardiac denervated dogs undergoing low frequency + 2g sinusoidal acceleration; (2) Comparison of autonomic effector blockade with ganglionic blockade; and (3) The effect of cardiac denervation on cardiovascular function before and after autonomic effector blockade. GRA

**N82-23979#** London Univ. (England). School of Hygiene and Tropical Medicine.

**HEALTH HAZARDS OF VISUAL DISPLAY UNITS WITH PARTICULAR REFERENCE TO OFFICE ENVIRONMENTS**

Rachel Birnbaum 1981 13 p refs

(PB82-120627) Avail: NTIS HC A02/MF A01 CSCL 06J

The interaction of man and the visual display unit (VDU) takes place during major tasks, which may make up the greater part of the job of the worker. The occupational health effects of VDUs derive primarily from the effects of long exposure of the worker to the light, reflection, glare and flickering of the CRT screen. The majority of problems therefore tend to be perceptual and the precipitating causes tend to be multiple and interactive. These and other ergonomic problems of the VDU operator are summarized. T.M.

**N82-23980#** Dayton Univ., Ohio. Research Inst.

**CONDUCTING STUDIES OF TRANSFER OF LEARNING: A PRACTICAL GUIDE Final Report**

Thomas A. Payne Brooks AFB, Tex. AFHRL Jan. 1982 32 p refs

(Contract F33615-77-C-0054; AF Proj. 1123)

(AD-A110569; AFHRL-TR-81-25)

Avail: NTIS

HC A03/MF A01 CSCL 05/9

This is a guide for use by the practical researcher concerned with conducting studies of transfer from pretraining of pilots in ground-based environments to performance in aircraft. While the material addresses principally transfer of learning of pilots, many of the issues should be applicable to other contexts, to include training of other aircrew members or even individuals who have quite different tasks to perform. The paper does not deal with theory but, rather, is concerned entirely with method of the transfer study. Method issues, to include the planning, tasks students, performance measurement, instructors, and analyses, are central to arriving at precise estimates of transfer effects--approaching as closely as possible the maximum that might have been demonstrated, providing a goal for the operational instructor pilot. Study models discussed include those for percent transfer of learning and the for transfer effectiveness ratio. Use of the latter should be essential in providing answers to contemporary questions concerning how much simulator pretraining can be used to replace aircraft training time--without reducing the goodness of the end product, the combat effective pilot. Author (GRA)

**N82-23981#** Minnesota Univ., Minneapolis. Dept. of Psychology.

**DIMENSIONALITY OF MEASURED ACHIEVEMENT OVER TIME**

Kathleen A. Gialluca and David J. Weiss Dec. 1981 45 p refs  
(Contract N00014-79-C-0172; RR0420401; NR Proj. 150-433)  
(AD-A110955; RR-81-5) Avail: NTIS HC A03/MF A01 CSCL 05/10

Some type of difference or change score is frequently used to quantify the effects of experimental treatments and educational programs on individuals and on groups of individuals. Whether the change measurement involves the use of simple difference scores, their derivatives, or some more complex methodological design, the measurement process itself assumes that the treatment or instruction results in higher levels of the originally measured variable and that the only change that occurs is a quantitative one. If this assumption is not met, then the computation of any type of difference score is inappropriate and the scores themselves are useless for measuring growth or change. Two studies investigated the tenability of the assumption that classroom instruction results in increases in students' achievement levels while the qualitative nature of that achievement remains constant across time. The data utilized were the item responses to tests in basic mathematics and in general biology administered as pretests and after instruction to students enrolled in those courses. Results included that this assumption was not tenable in the biology data set, where increases in mean achievement level were accompanied by corresponding changes in the factor structure underlying the item responses. For the mathematics data, however, there was no such violation of the assumption: As student achievement levels increased the underlying factor structure remained unchanged. The implications of these results for psychology, education, and program evaluation are noted.

Author (GRA)

**N82-23982\*# Metrics, Inc., Atlanta, Ga. CELSS SCENARIO ANALYSIS: BREAK-EVEN CALCULATIONS Final Report**

Robert M. Mason Apr. 1980 42 p refs  
(NASA Order A-70035B)  
(NASA-CR-166319; NAS 1.26:166319) Avail: NTIS HC A03/MF A01 CSCL 06H

A model of the relative mass requirements of food production components in a controlled ecological life support system (CELSS) based on regenerative concepts is described. Included are a discussion of model scope, structure, and example calculations. Computer programs for cultivar and breakeven calculations are also included. B.W.

**N82-23983\*# Texas Univ., Austin. Dept. of Zoology. LITERATURE REVIEW OF HUMAN MICROBES' INTERACTION WITH PLANTS**

Bassett Maguire, Jr. Aug. 1980 217 p refs  
(NASA Order A-77042)  
(NASA-CR-166330; NAS 1.26:166330) Avail: NTIS HC A10/MF A01 CSCL 06C

Human carried microorganisms, which cannot practically be excluded from human supporting agricultural systems of extra terrestrial stations, are considered. These microorganisms damage the plants on which the people depend for oxygen and food. The inclusion of carefully screened or constructed, but more or less normal, phylloplane and rhizosphere microbial communities is studied. S.L.

**N82-23984\*# New Hampshire Univ., Durham. Complex Systems Research Center. AN APPROACH TO THE MATHEMATICAL MODELLING OF A CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM**

Maurice M. Avern Aug. 1981 78 p refs  
(Contract NAS2-10133)  
(NASA-CR-166331; NAS 1.26:166331) Avail: NTIS HC A05/MF A01 CSCL 05H

An approach to the design of a computer based model of a closed ecological life-support system suitable for use in extraterrestrial habitats is presented. The model is based on elemental mass balance and contains representations of the metabolic activities of biological components. The model can be used as a tool in evaluating preliminary designs for closed regenerative life support systems and as a method for predicting the behavior of such systems. T.M.

**N82-23985\*# Purdue Univ., Lafayette, Ind. Dept. of**

Horticulture.

**NUTRITIONAL AND CULTURAL ASPECTS OF PLANT SPECIES SELECTION FOR A CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM**

J. E. Hoff, J. M. Howe, and C. A. Mitchell Mar. 1982 129 p refs  
(Grants NsG-2401; NsG-2404)  
(NASA-CR-166324; NAS 1.26:166324) Avail: NTIS HC A07/MF A01 CSCL 06H

The feasibility of using higher plants in a controlled ecological life support system is discussed. Aspects of this system considered important in the use of higher plants include: limited energy, space, and mass, and problems relating to cultivation and management of plants, food processing, the psychological impact of vegetarian diets, and plant propagation. A total of 115 higher plant species are compared based on 21 selection criteria. B.W.

**N82-23986# Institute for Perception RVO-TNO, Soesterberg (Netherlands). SAFE WEARING TIMES FOR IMPERMEABLE CHEMICAL PROTECTIVE CLOTHING**

W. A. Lotens [1982] 15 p refs In: DUTCH; ENGLISH summary  
(IZF-1980-11; TDCK-75010) Avail: NTIS HC A02/MF A01

Computer assisted calculations were made to predict the course of the rectal temperature and heat storage of a working man, wearing impermeable protective garments. The calculations were based on the Givoni-Goldman system as well as on a developed heat exchange model. The results are different and the latter model seems to have a slight preference. Safety limits are given in terms of work-rest ratios for long wearing times and in terms of tolerance times for continuous work and for various values of climate and work. Author

**N82-23987\*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif. PROJECT OASIS: THE DESIGN OF A SIGNAL DETECTOR FOR THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE Final Report**

Steven Lord, ed. (Massachusetts Univ.), Robert Dixon, ed. (Ohio State Univ.), and Timothy Healy, ed. (Santa Clara Univ.) 1981 445 p refs  
(Grant NGT-05-017-998)  
(NASA-TM-84738; NAS 1.15:84738) Avail: NTIS HC A19/MF A01 CSCL 06C

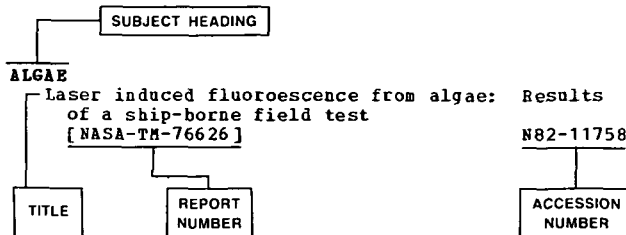
An 8 million channel spectrum analyzer (MCSA) was designed to meet the needs of a SETI program. The MCSA puts out a very large data base at very high rates. The development of a device which follows the MCSA, is presented. S.L.

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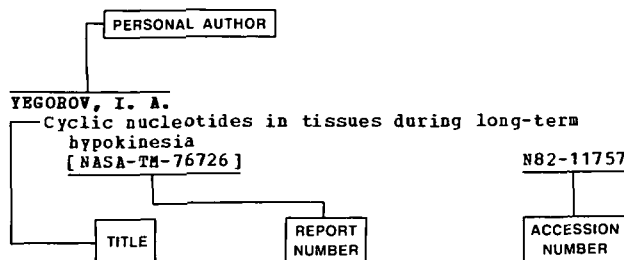


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ZYBIN, O. KH.  
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hemodynamics and coronary blood supply in the  
healthy human

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